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Collins et al.

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(54) **PREMANUFACTURED STRUCTURES FOR CONSTRUCTING BUILDINGS**

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(73) Assignee: **Innovative Building Technologies, LLC**, Seattle, WA (US)

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E04H 1/00 (2006.01)
E04H 3/00 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC . ***E04B 1/24*** (2013.01); ***E04B 1/003*** (2013.01); *E04B 2/7411* (2013.01); ***E04B 2/7448*** (2013.01); ***E04B 2/82*** (2013.01); ***E04B 2/90*** (2013.01); *E04B 2001/2481* (2013.01); *E04B 2001/2484* (2013.01); ***E04H 1/04*** (2013.01)
USPC **52/236.3**; 52/234

(58) **Field of Classification Search**
USPC 52/79.1, 79.12, 79.14, 236.3, 236.6, 52/236.7, 79.5, 236.8, 745.03, 745.02, 52/741.1, 175
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,883,376 A 10/1932 Meier et al.
2,419,319 A 4/1947 Lankton
(Continued)

FOREIGN PATENT DOCUMENTS

AU 2005200682 B1 5/2005
CN 02137279 3/2008
(Continued)

OTHER PUBLICATIONS

Riusillo, M.A., "Lift Slab Construction: its History, Methodology, Economics and Applications." Jun. 1, 1988, ACI—Abstract.
(Continued)

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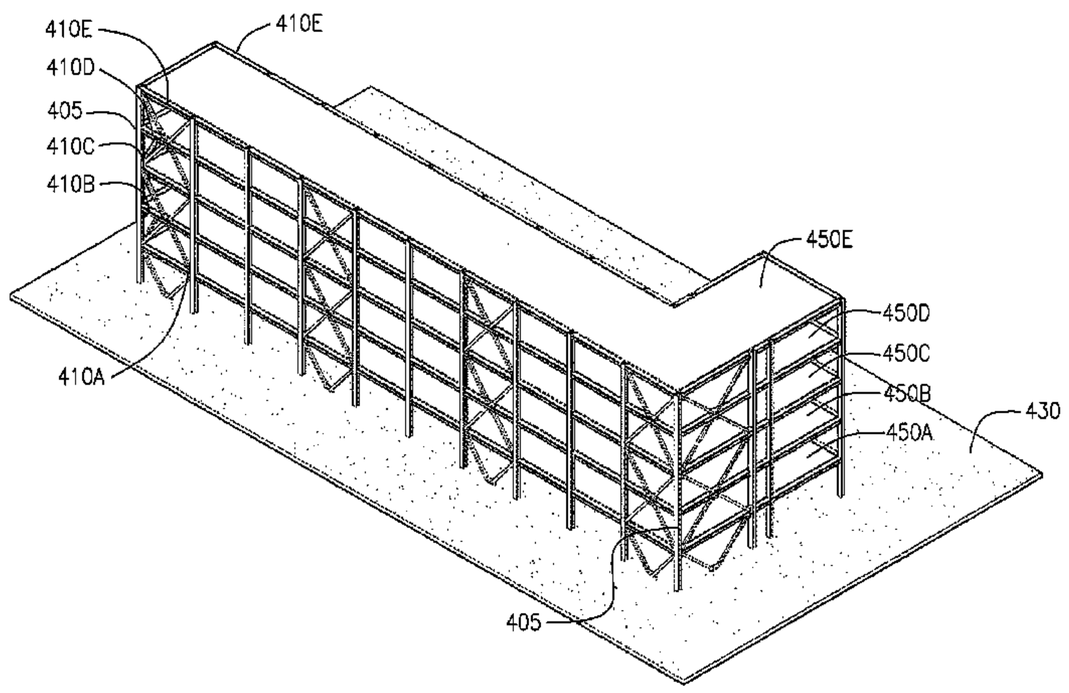
Assistant Examiner — Paola Agudelo
(74) *Attorney, Agent, or Firm* — Dorsey & Whitney LLP

(57) **ABSTRACT**

The present premanufactured structures for constructing buildings comprises a construction system for an energy efficient multi-story building with a plurality of standard single or mixed units. The multi-story building is constructed using premanufactured structures comprising: a plurality of non-weight bearing walls, the plurality of non-weight bearing walls with finished exterior including all electrical, insulating, plumbing and communications components that are premanufactured at a site distant from a building site, and the plurality of non-weight bearings walls are attached to a plurality of floor and ceiling slabs and interfacing with each other to enclose the plurality of units of the building; a plurality of interior components that are premanufactured at the site distant from the building site to connect to inside portions of the non-weight bearing walls; and a plurality of exterior components that are premanufactured at the site distant from the building site to attach to exterior surfaces of the building. The plurality of non-weight bearing walls, the plurality of interior components, and the plurality of exterior components are installed and connected together to provide the energy efficient multi-story building with the plurality of units with different floor plans, and optionally, a retail level with underground parking.

24 Claims, 42 Drawing Sheets



(51) **Int. Cl.**

E04H 5/00	(2006.01)
E04H 6/00	(2006.01)
E04H 14/00	(2006.01)
E04B 1/24	(2006.01)
E04B 1/00	(2006.01)
E04B 2/82	(2006.01)
E04B 2/90	(2006.01)
E04H 1/04	(2006.01)
E04B 2/74	(2006.01)

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,562,050	A		7/1951	Lankton	
2,686,420	A		8/1954	Youtz	
2,871,544	A		2/1959	Youtz	
3,017,723	A		1/1962	Von Heidenstam	
3,052,449	A		9/1962	Long et al.	
3,053,015	A		9/1962	Graham	
3,221,454	A		12/1965	Togni	
3,245,183	A		4/1966	Tessin	
3,388,512	A	*	6/1968	Newman	52/64
3,490,191	A		1/1970	Ekblom	
3,579,935	A		5/1971	Regan et al.	
3,590,393	A		7/1971	Hollander	
3,594,965	A		7/1971	Saether	
3,604,174	A	*	9/1971	Nelson, Jr.	52/601
3,638,380	A	*	2/1972	Perri	52/79.12
3,707,165	A		12/1972	Stahl	
3,713,265	A	*	1/1973	Wysocki et al.	52/745.14
3,721,056	A	*	3/1973	Toan	52/236.6
3,722,169	A		3/1973	Boehmig	
3,727,753	A		4/1973	Starr	
3,742,666	A		7/1973	Antoniou	
3,755,974	A		9/1973	Berman	
3,762,115	A		10/1973	McCaul, III	
3,766,574	A		10/1973	Smid, Jr.	
3,821,818	A		7/1974	Alosi	
3,853,452	A		12/1974	Delmonte	
3,906,686	A		9/1975	Dillon	
3,921,362	A		11/1975	Ortega	
3,926,486	A		12/1975	Sasnett	
3,971,605	A		7/1976	Sasnett	
3,974,618	A	*	8/1976	Cortina	52/745.14
4,050,215	A		9/1977	Fisher	
4,078,345	A		3/1978	Piazzalunga	
4,107,886	A		8/1978	Ray	
4,142,255	A		3/1979	Togni	
4,171,545	A		10/1979	Kann	
4,178,343	A		12/1979	Rojo, Jr.	
4,221,441	A		9/1980	Bain	
4,226,061	A		10/1980	Day, Jr.	
4,280,307	A		7/1981	Griffin	
4,314,430	A		2/1982	Farrington	
4,325,205	A		4/1982	Salim	
4,327,529	A		5/1982	Bigelow, Jr.	
4,341,052	A		7/1982	Douglass, Jr.	
4,435,927	A		3/1984	Umezu et al.	
4,441,286	A	*	4/1984	Skvaril	52/79.1
4,447,996	A		5/1984	Maurer, Jr.	
4,477,934	A	*	10/1984	Salminen	4/663
4,507,901	A		4/1985	Carroll	
4,513,545	A		4/1985	Hopkins, Jr.	
4,528,793	A		7/1985	Johnson	
4,646,495	A	*	3/1987	Chalik	52/236.8
4,655,011	A		4/1987	Borges	
4,856,244	A		8/1989	Clapp	
4,919,164	A		4/1990	Barenburg	
5,076,310	A		12/1991	Barenburg	
5,205,091	A		4/1993	Brown	
5,307,600	A		5/1994	Simon, Jr.	
5,359,820	A		11/1994	McKay	
5,402,612	A		4/1995	diGirolamo et al.	
5,412,913	A	*	5/1995	Daniels et al.	52/79.13
5,459,966	A		10/1995	Suarez	
5,471,804	A		12/1995	Winter, IV	
5,493,838	A		2/1996	Ross	
5,509,242	A		4/1996	Rechsteiner et al.	
5,528,877	A		6/1996	Franklin	
5,628,158	A		5/1997	Porter	
5,660,017	A		8/1997	Houghton	
5,678,384	A		10/1997	Maze	
5,697,189	A		12/1997	Miller	
5,699,643	A		12/1997	Kinard	
5,724,773	A		3/1998	Hall	
5,755,982	A		5/1998	Strickland	
5,850,686	A		12/1998	Mertes	
5,867,964	A		2/1999	Perrin	
5,870,867	A		2/1999	Mitchell	
5,987,841	A		11/1999	Campo	
5,997,792	A		12/1999	Gordon	
6,000,194	A		12/1999	Nakamura	
6,073,401	A	*	6/2000	Iri et al.	52/79.1
6,076,319	A		6/2000	Hendershot	
6,086,350	A		7/2000	Del Monte	
6,154,774	A		11/2000	Furlong	
6,243,993	B1		6/2001	Swensson	
6,244,008	B1		6/2001	Miller	
6,260,329	B1		7/2001	Mills	
6,301,838	B1		10/2001	Hall	
6,308,465	B1		10/2001	Galloway et al.	
6,308,491	B1		10/2001	Porter	
6,393,774	B1		5/2002	Fisher	
6,481,172	B1		11/2002	Porter	
6,484,460	B2		11/2002	VanHaitsma	
6,625,937	B1		9/2003	Parker	
6,651,393	B2		11/2003	Don	
6,837,013	B2		1/2005	Foderberg et al.	
6,922,960	B2		8/2005	Sataka	
7,143,555	B2		12/2006	Miller	
7,389,620	B1		6/2008	McManus	
7,395,999	B2		7/2008	Walpole	
7,444,793	B2		11/2008	Raftery et al.	
7,467,469	B2		12/2008	Wall	
7,484,339	B2		2/2009	Fiehler	
7,676,998	B2		3/2010	Lessard	
7,694,462	B2		4/2010	O'Callaghan	
7,721,491	B2	*	5/2010	Appel	52/169.7
7,748,193	B2		7/2010	Knigge et al.	
7,908,810	B2		3/2011	Payne, Jr. et al.	
7,921,965	B1		4/2011	Surace	
8,109,058	B2		2/2012	Miller	
8,234,833	B2		8/2012	Miller	
8,251,175	B1		8/2012	Englert et al.	
8,322,086	B2		12/2012	Weber	
8,359,808	B2		1/2013	Stephens, Jr.	
8,424,251	B2		4/2013	Tinianov	
8,539,732	B2		9/2013	Leahy	
8,555,581	B2		10/2013	Amend	
8,621,806	B2		1/2014	Studebaker et al.	
8,769,891	B2		7/2014	Kelly	
2002/0059763	A1		5/2002	Wong	
2002/0170243	A1	*	11/2002	Don et al.	52/79.7
2003/0005653	A1	*	1/2003	Sataka	52/236.3
2003/0101680	A1	*	6/2003	Lee	52/745.2
2003/0140571	A1		7/2003	Muha et al.	
2003/0167712	A1		9/2003	Robertson	
2004/0103596	A1		6/2004	Don	
2005/0081484	A1		4/2005	Yland	
2005/0108957	A1	*	5/2005	Quesada	52/143
2005/0188632	A1		9/2005	Rosen	
2005/0198919	A1		9/2005	Hester, Jr.	
2005/0210764	A1		9/2005	Foucher et al.	
2005/0235581	A1		10/2005	Cohen	
2005/0247013	A1		11/2005	Walpole	
2006/0021289	A1	*	2/2006	Elmer	52/200
2006/0096202	A1		5/2006	Delzotto	
2006/0117689	A1		6/2006	Onken et al.	
2006/0179764	A1		8/2006	Ito	
2006/0248825	A1		11/2006	Garringer	
2007/0074464	A1		4/2007	Eldridge	
2007/0107349	A1		5/2007	Erker	
2007/0157539	A1		7/2007	Knigge et al.	
2007/0163197	A1		7/2007	Payne et al.	

(56) **References Cited**

U.S. PATENT DOCUMENTS

2007/0209306	A1	9/2007	Andrews et al.	
2007/0294954	A1	12/2007	Barrett	
2008/0057290	A1	3/2008	Guevara et al.	
2008/0104901	A1	5/2008	Olvera	
2008/0168741	A1	7/2008	Gilgan	
2008/0178542	A1	7/2008	Williams	
2008/0282626	A1	11/2008	Powers, Jr.	
2008/0289265	A1	11/2008	Lessard	
2008/0295450	A1	12/2008	Yogev	
2009/0100769	A1	4/2009	Barrett	
2009/0113820	A1	5/2009	Deans	
2009/0134287	A1	5/2009	Klosowski	
2009/0165399	A1 *	7/2009	Campos Gines	52/79.1
2009/0205277	A1	8/2009	Gibson	
2009/0293395	A1	12/2009	Porter	
2010/0064601	A1	3/2010	Napier	
2010/0186313	A1	7/2010	Stanford et al.	
2010/0229472	A1	9/2010	Malpas	
2010/0263308	A1	10/2010	Olvera	
2010/0325971	A1	12/2010	Leahy	
2010/0325989	A1	12/2010	Leahy	
2011/0023381	A1	2/2011	Weber	
2011/0056147	A1	3/2011	Beaudet	
2011/0296778	A1	12/2011	Collins et al.	
2011/0296789	A1	12/2011	Collins et al.	
2011/0300386	A1	12/2011	Pardue, Jr.	
2012/0151869	A1	6/2012	Miller	
2013/0067832	A1	3/2013	Collins et al.	
2013/0133277	A1	5/2013	Lewis	
2014/0013695	A1	1/2014	Wolynski et al.	
2014/0047780	A1	2/2014	Quinn et al.	
2014/0059960	A1	3/2014	Cole	
2014/0069035	A1	3/2014	Collins et al.	
2014/0083046	A1	3/2014	Yang	
2014/0130441	A1	5/2014	Sugihara et al.	

FOREIGN PATENT DOCUMENTS

EP	1739246	A1	1/2011
EP	2281964	A1	2/2011
GB	1045078	A2	10/2000
JP	H0130985	A	1/1991
JP	10234493		9/1998
JP	2000144997	A	5/2000
JP	2008073434		4/2008
JP	2008110104		5/2008
KR	20060066931	B1	6/2006
WO	WO 97/22770		6/1997
WO	WO 2007/059003		5/2007
WO	WO 2010/030060		3/2010

OTHER PUBLICATIONS

International Search Report and Written Opinion of the International Searching Authority for PCT Application No. PCT/US2011/001039 mailed on Oct. 5, 2011.

"Beam to column connection", TATA Steel, http://www.tatasteelconstruction.com/en/reference/teaching_resources/architectural_studio_reference/elements/connections/beam_to_column_connections, Jul. 9, 2014, pp. 1-4.

"Emerging Trends 2012 Executive Summary", Urban Land Institute, Ch. 1, 2011, pp. 3-13.

"How to Soundproof a Ceiling—Soundproofing Ceilings", http://www.soundproofingcompany.com/soundproofing-solutions/soundproof-a-ceiling/, Apr. 2, 2014, pp. 1-7.

Borzouie, Jamaledin, et al., "Seismic Assessment and Rehabilitation of Diaphragms—Technical report", http://www.nosazimadares.ir/behsazi/15WCEE2012/URM/1/Roof.pdf, Dec. 31, 2011, pp. 1-86.

"Structural Insulated Panel", Wikipedia, http://www.en.wikipedia.org//wiki/Structural_insulated_panel, Aug. 15, 2014.

"Structural Insulated Panels", SIP Solutions, http://www.sipsolutions.com/content/structural-insulated-panels, Aug. 15, 2014.

"US Apartment & Condominium Construction Forecast 2003-2017", Jun. 2012, Statista, Inc.

Azari, et al., "Modular Prefabricated Residential Construction—Constraints and Opportunities", PNCCRE Technical Report #TR002, Aug. 2013, pp. i-90.

Giles, et al., "Innovations in the Development of Industrially Designed and Manufactured Modular Concepts for Low-Energy, Multi-Story, High Density, Prefabricated Affordable Housing", Innovations in the Development of Industrially Designed and Manufactured Modular Concepts, 1-15.

Gonchar, "Paradigm Shift—Multistory Modular", Architectural Record, Oct. 2012, pp. 144-148.

Kerin, et al., "National Apartment Market Report—2013", Marcus & Millichap, 2013, 1-9.

McIlwain, "Housing in America—The Next Decade", Urban Land Institute, 2010, pp. 1-28.

McIlwain, "The Rental Boost From Green Design", Urban Land, Jan. 4, 2012, pp. 1-3.

Shashaty, Andre, "Housing Demand", Sustainable Communities, Apr. 2011, pp. 14-18.

Sichelman, "Severe Apartment Shortage Looms", Urban Land, http://urbanland.uli.org/capital-markets/nahb-orlando-severe-apartment-shortage-looms/, Jan. 13, 2011, pp. 1-2.

Stiemer, S F., "Bolted Beam-Column Connections", http://faculty.philau.edu/pastorec/Tensile/bolted_beam_column_connections.pdf, Nov. 11, 2007, pp. 1-16.

* cited by examiner

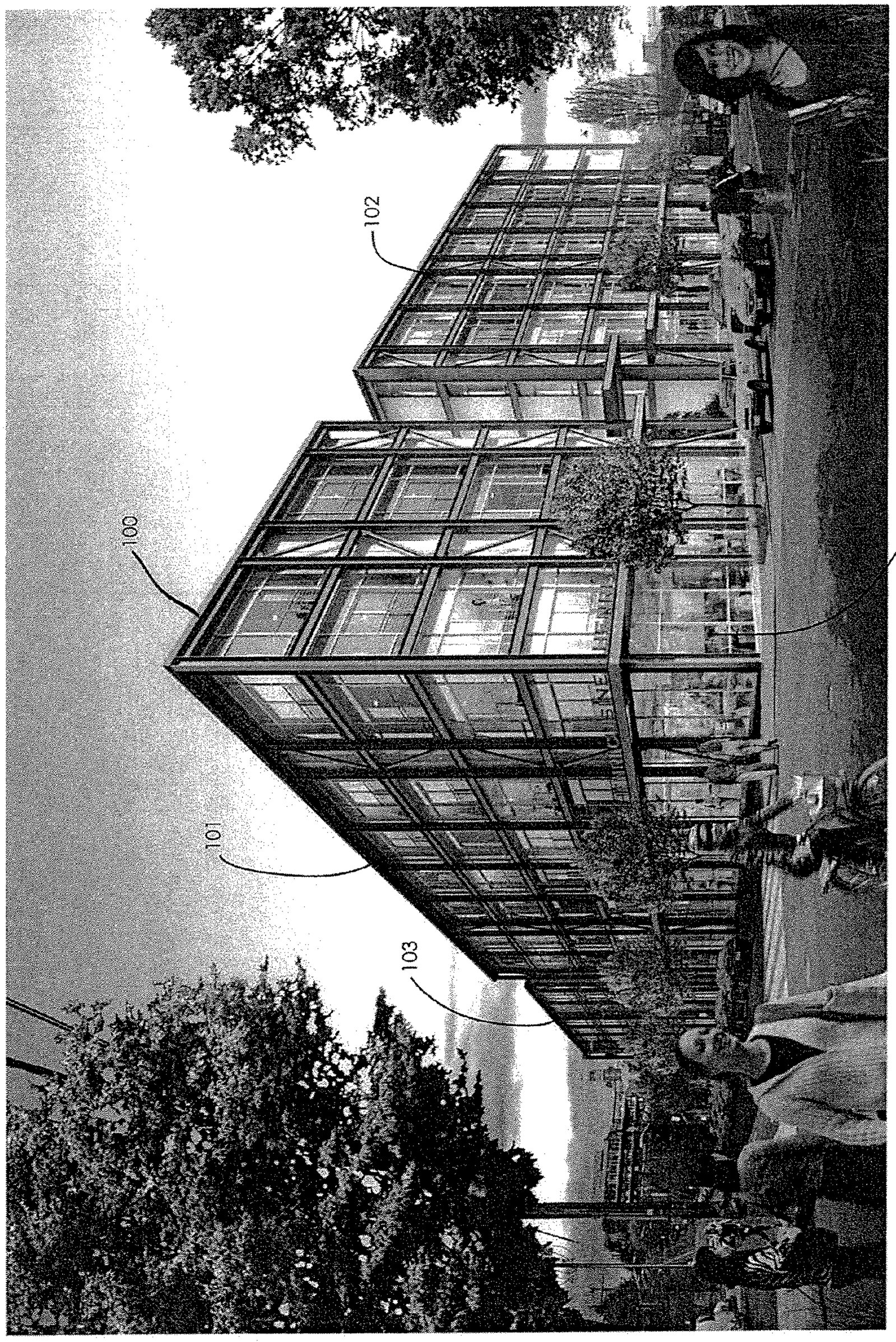
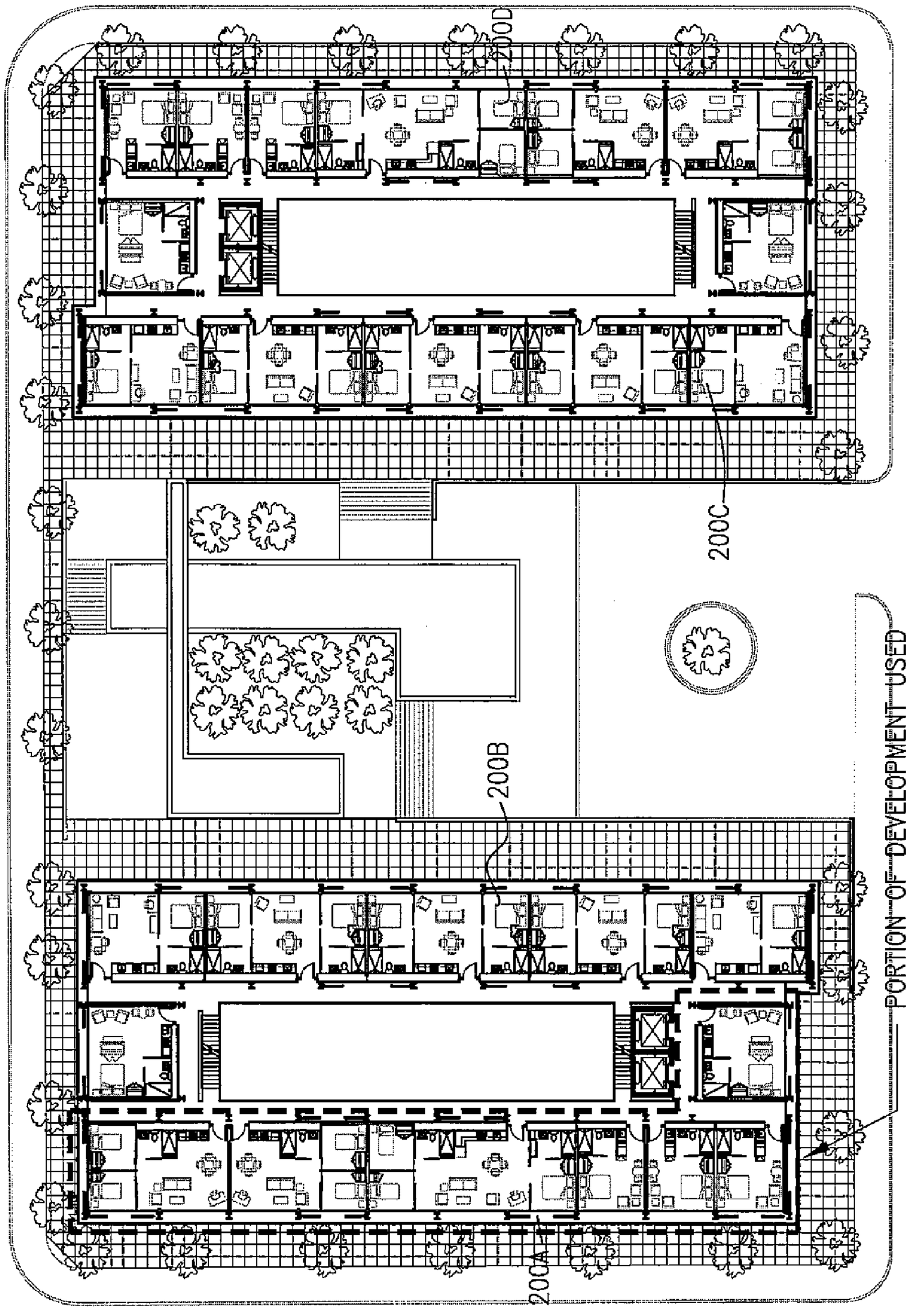


FIG. 1

FIG. 2


200
200C
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200A
PORTION OF DEVELOPMENT USED
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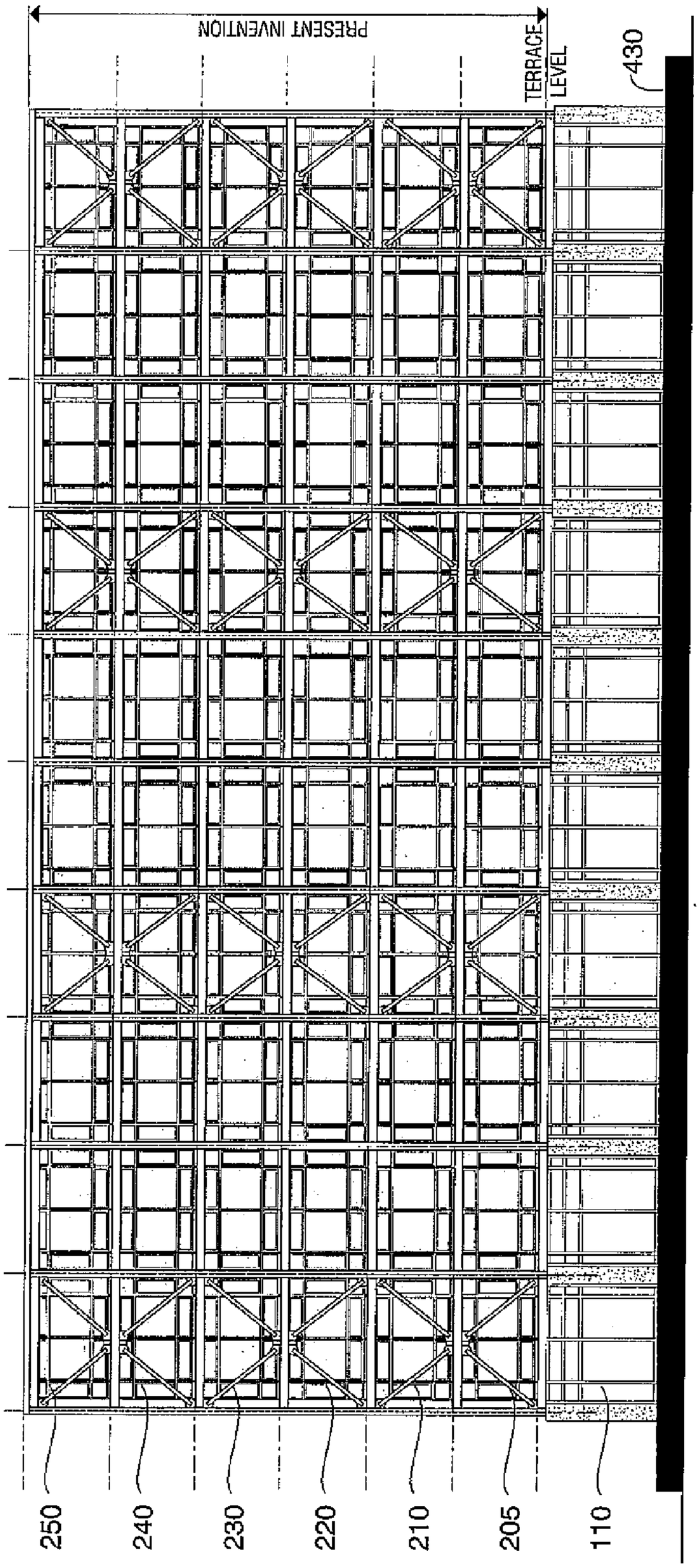
PRESENT INVENTION
TERRACE LEVEL
430
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230
220
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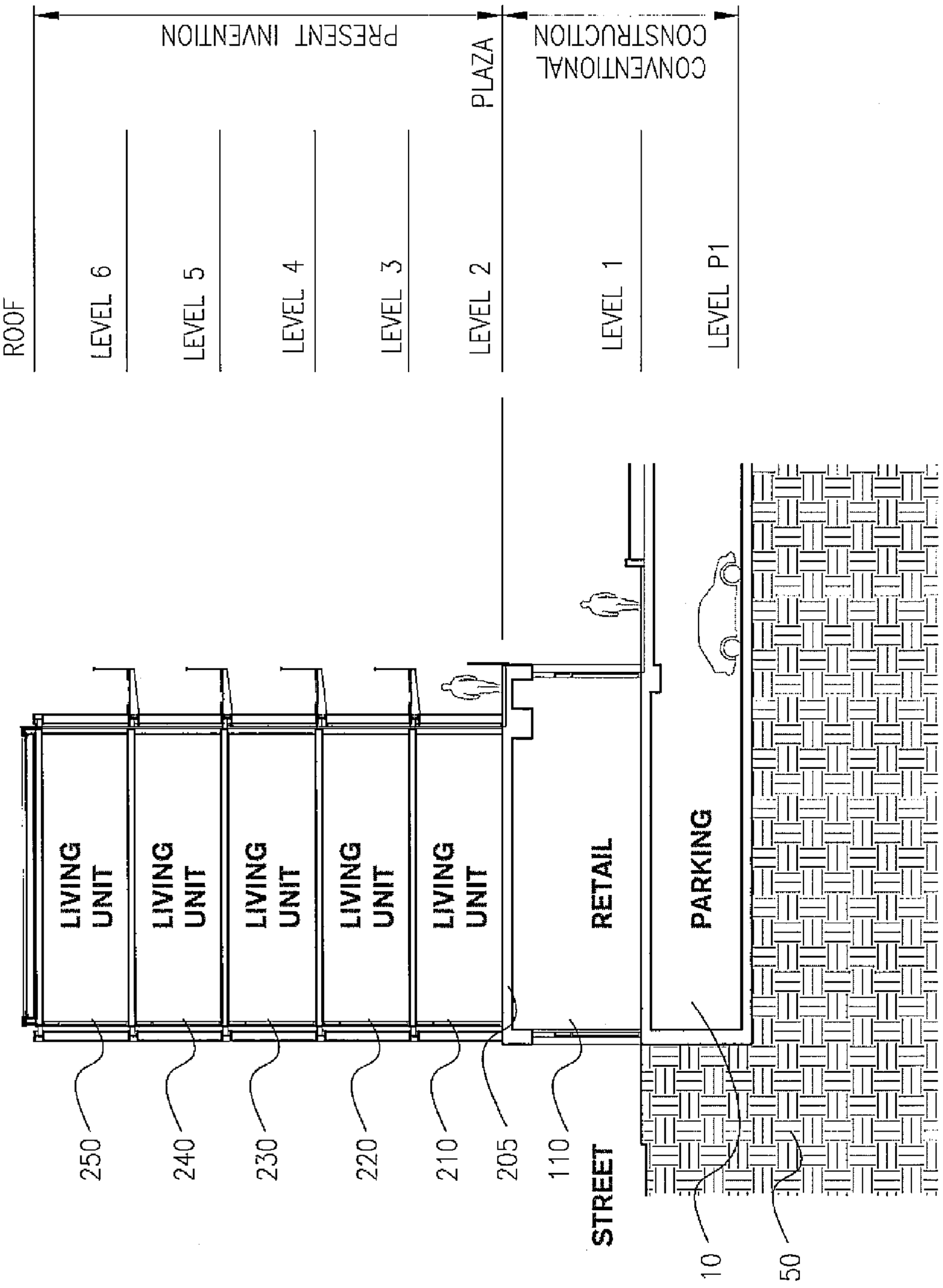
110

FIG. 3


PRESENT INVENTION
CONVENTIONAL CONSTRUCTION
PLAZA
ROOF
LEVEL 6
LEVEL 5
LEVEL 4
LEVEL 3
LEVEL 2
LEVEL 1
LEVEL P1
LIVING UNIT
LIVING UNIT
LIVING UNIT
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PARKING
STREET
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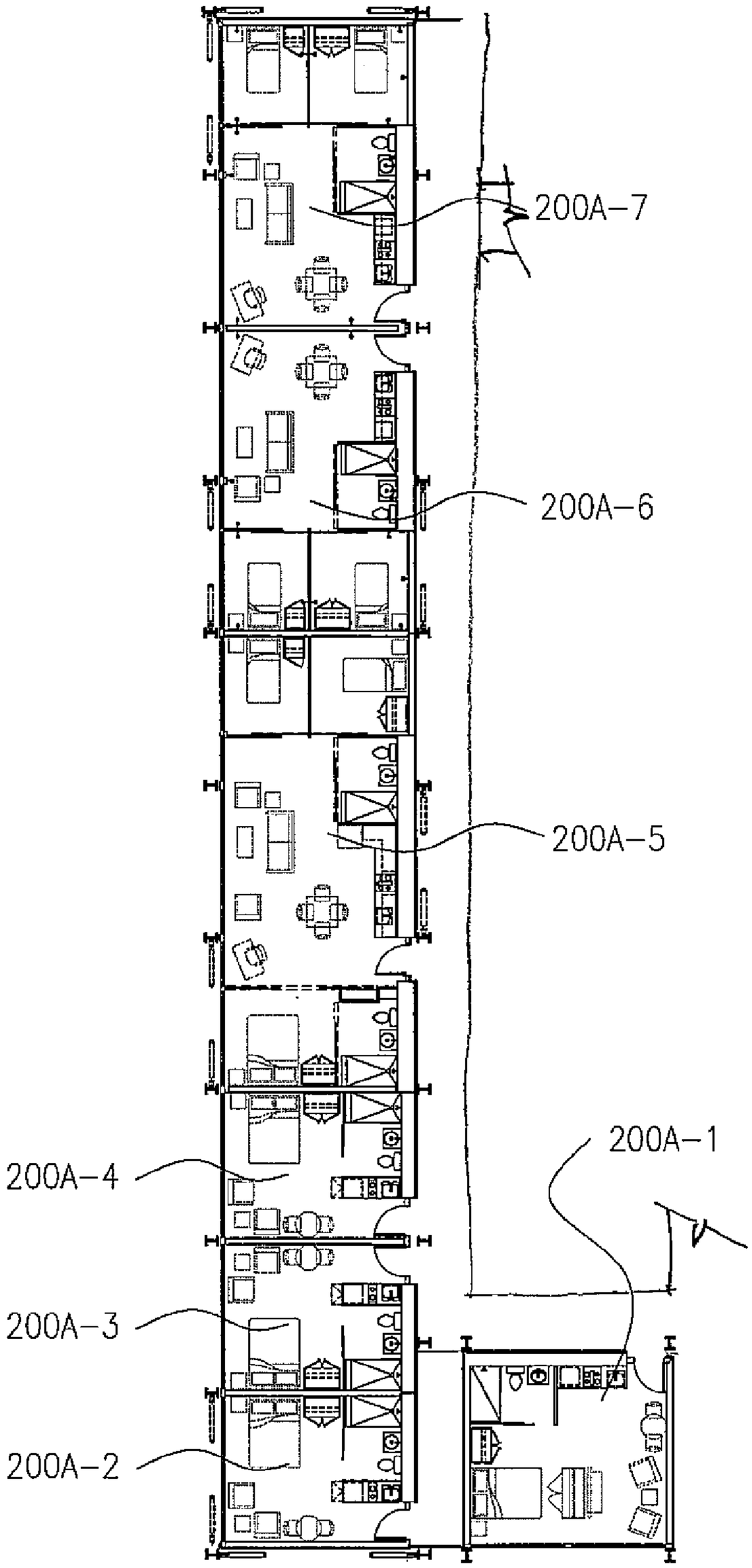
FIG. 4



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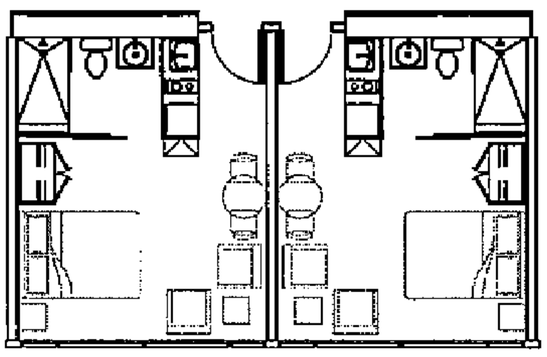

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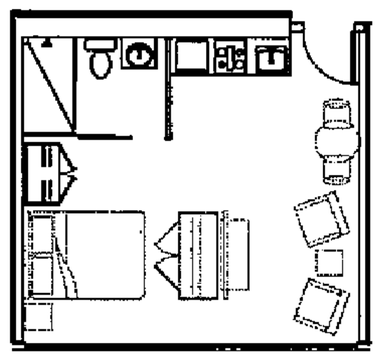

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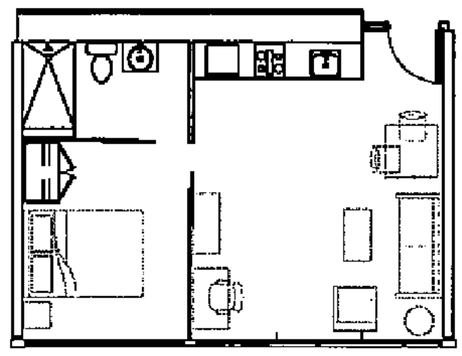

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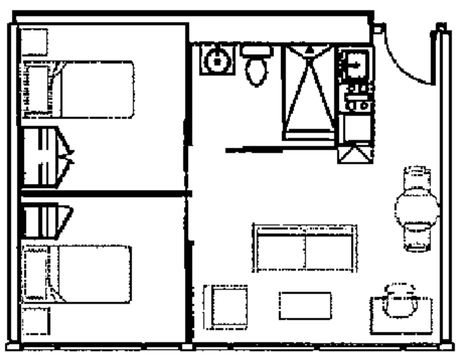

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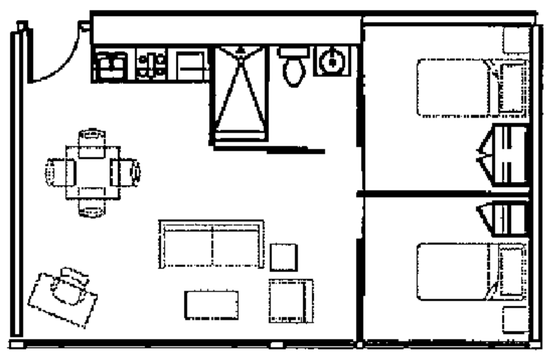

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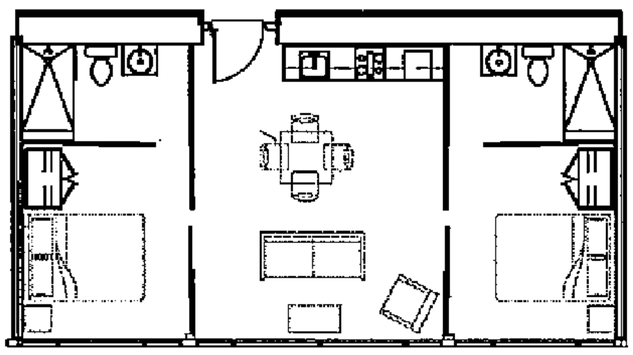

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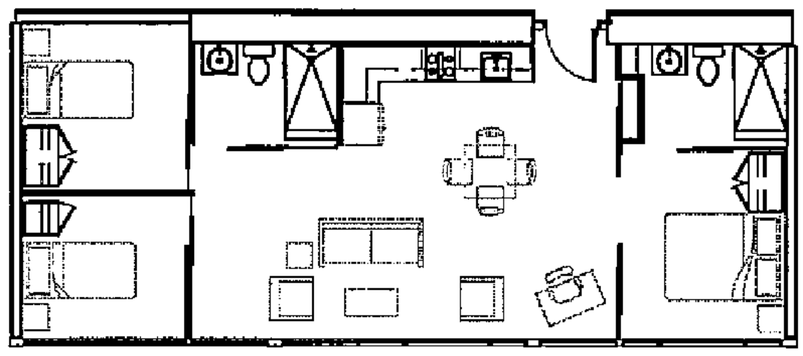

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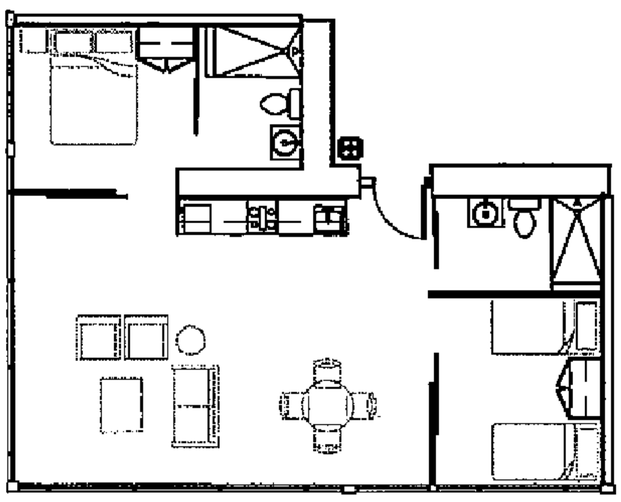

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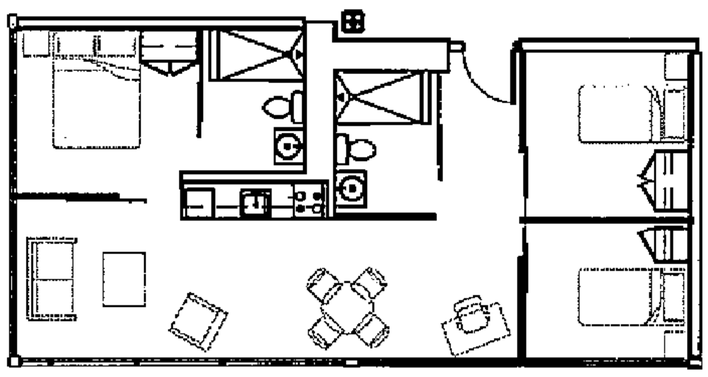


300J

FIG. 6

FIG. 7

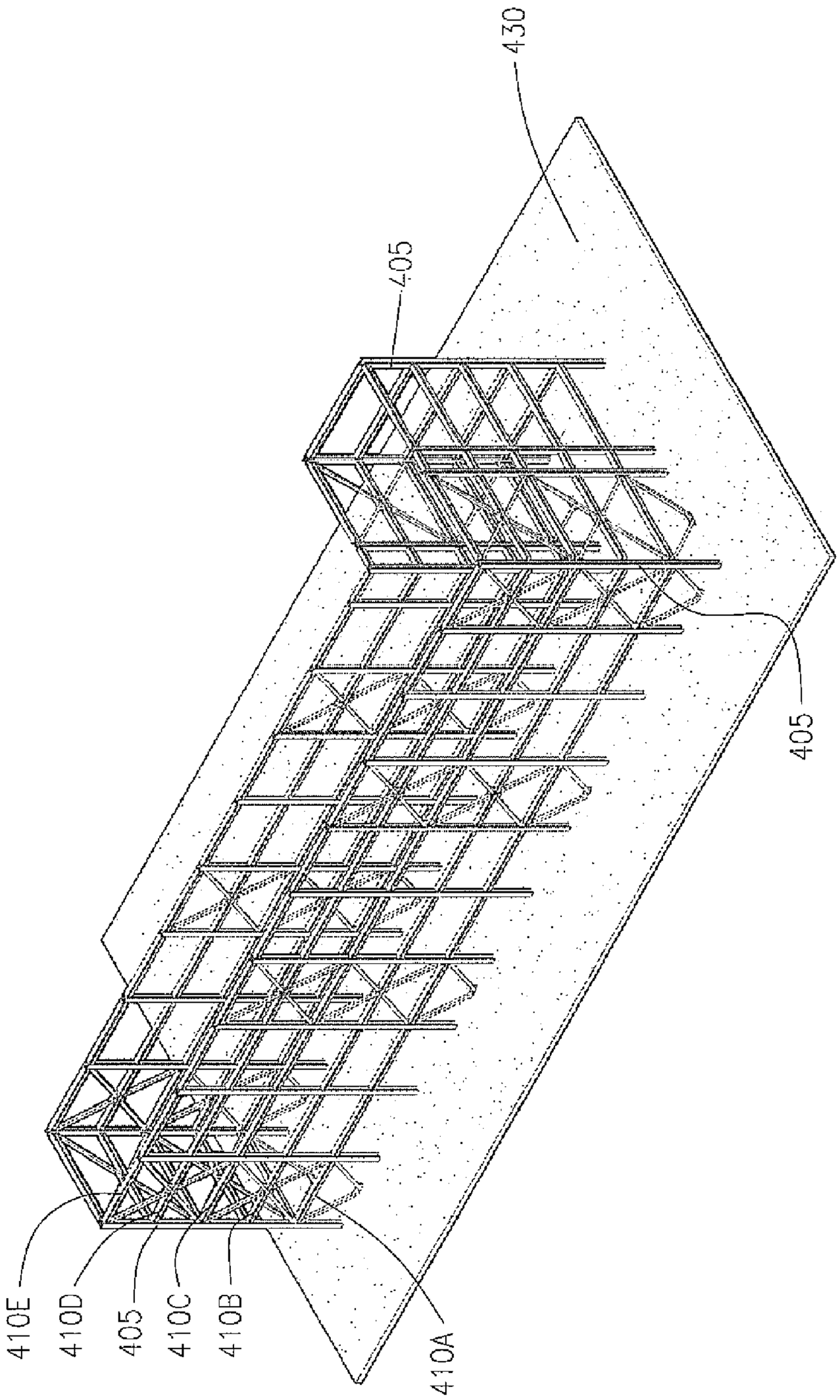


FIG. 8

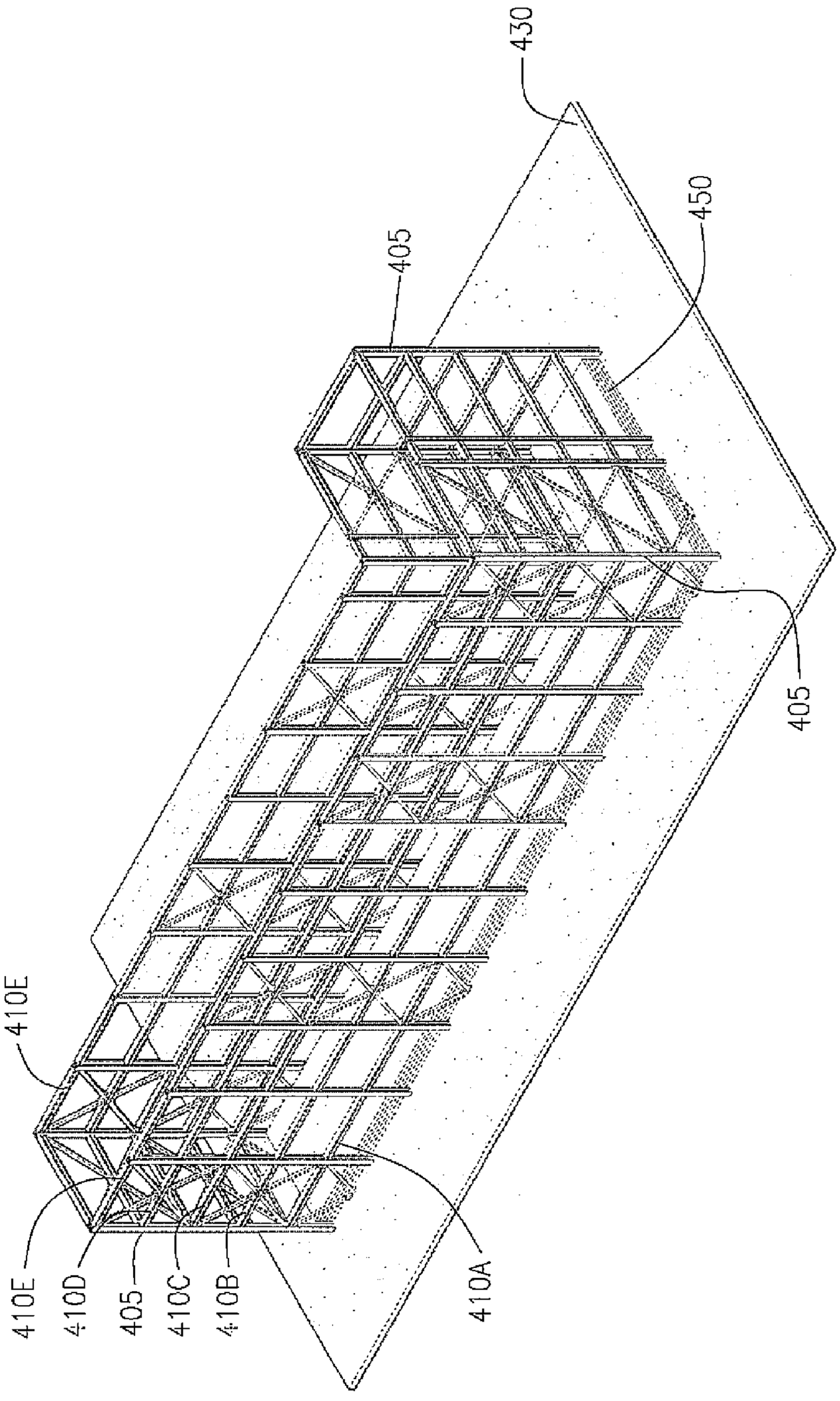
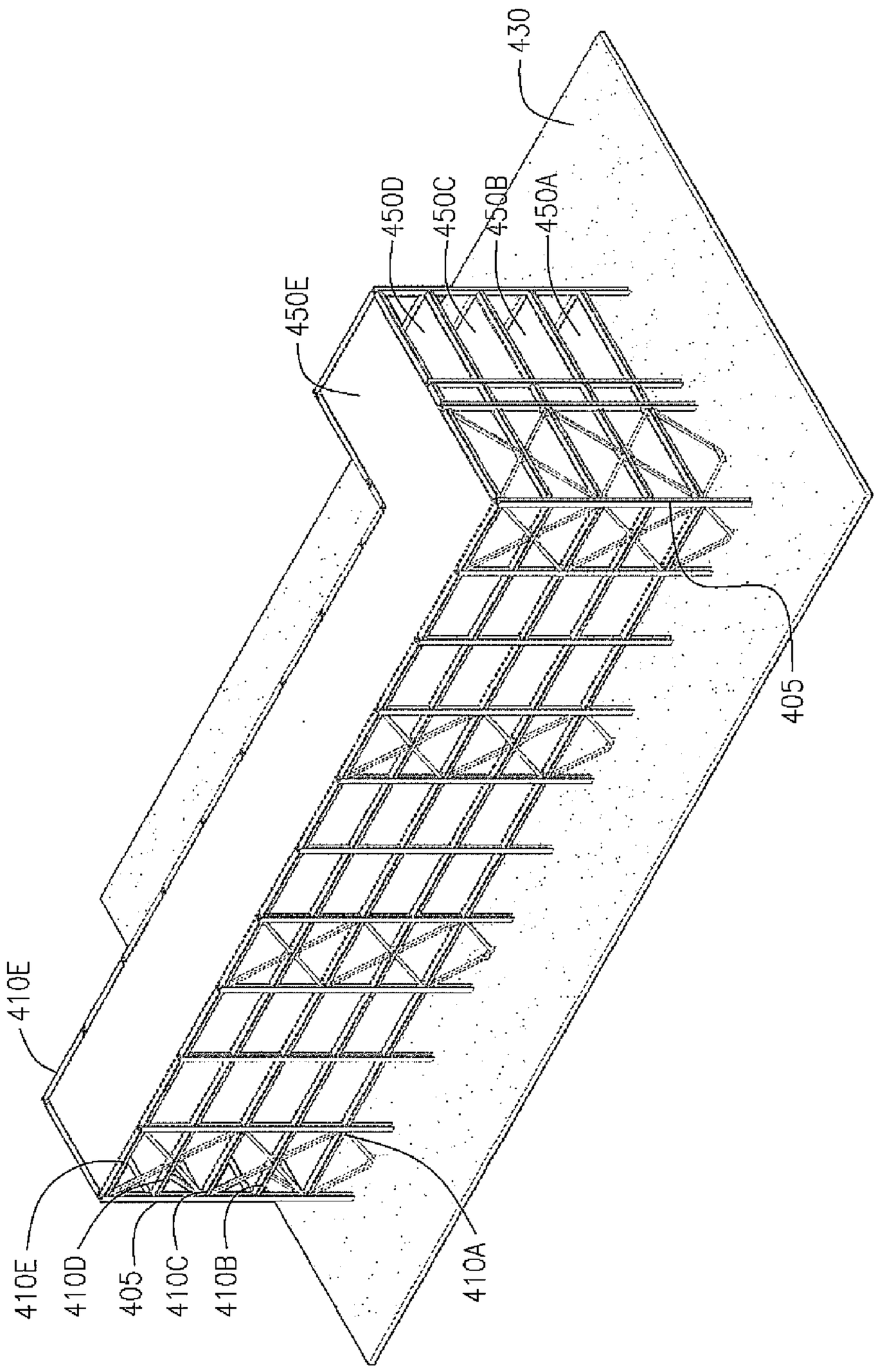


FIG. 9



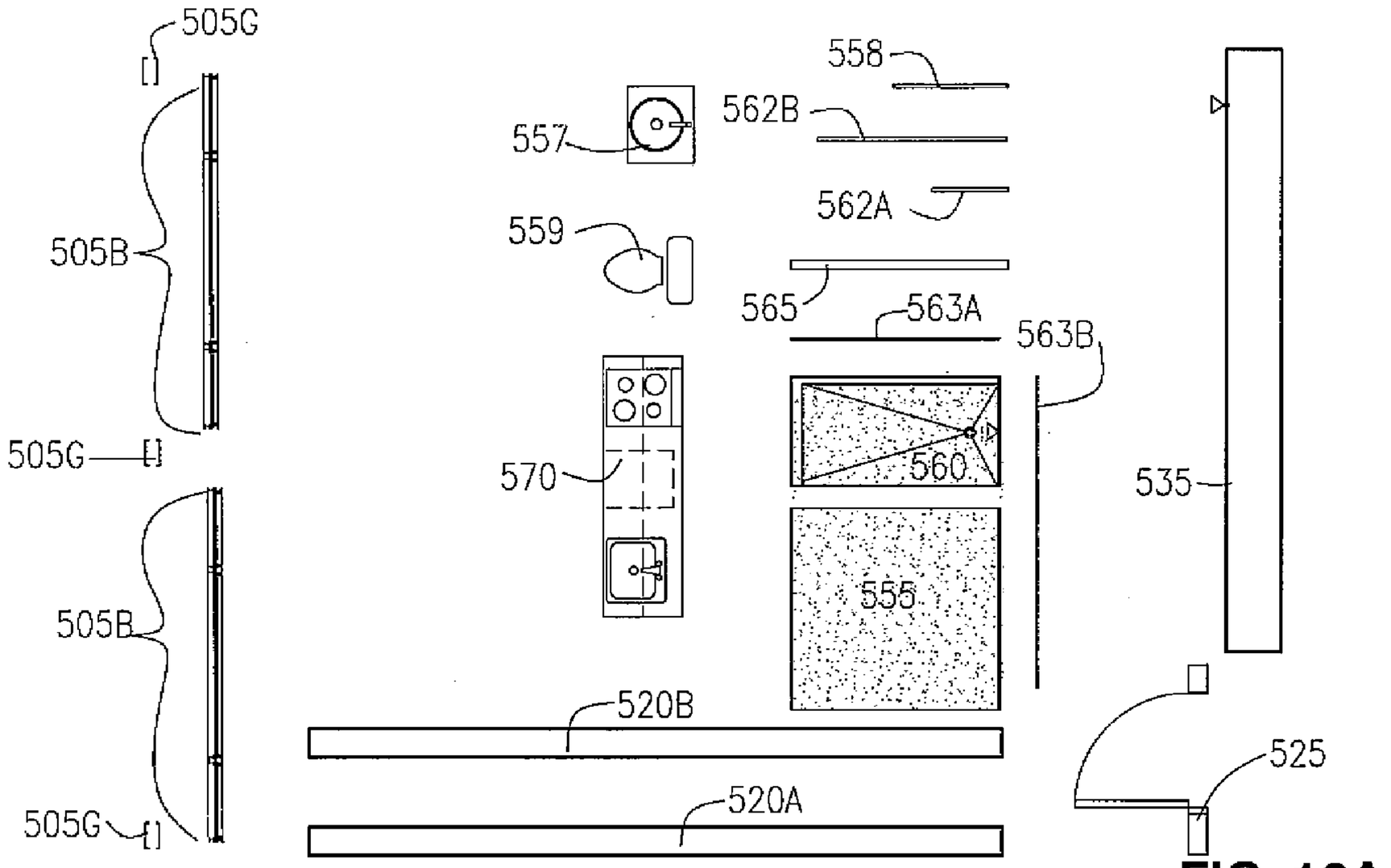


FIG. 10A

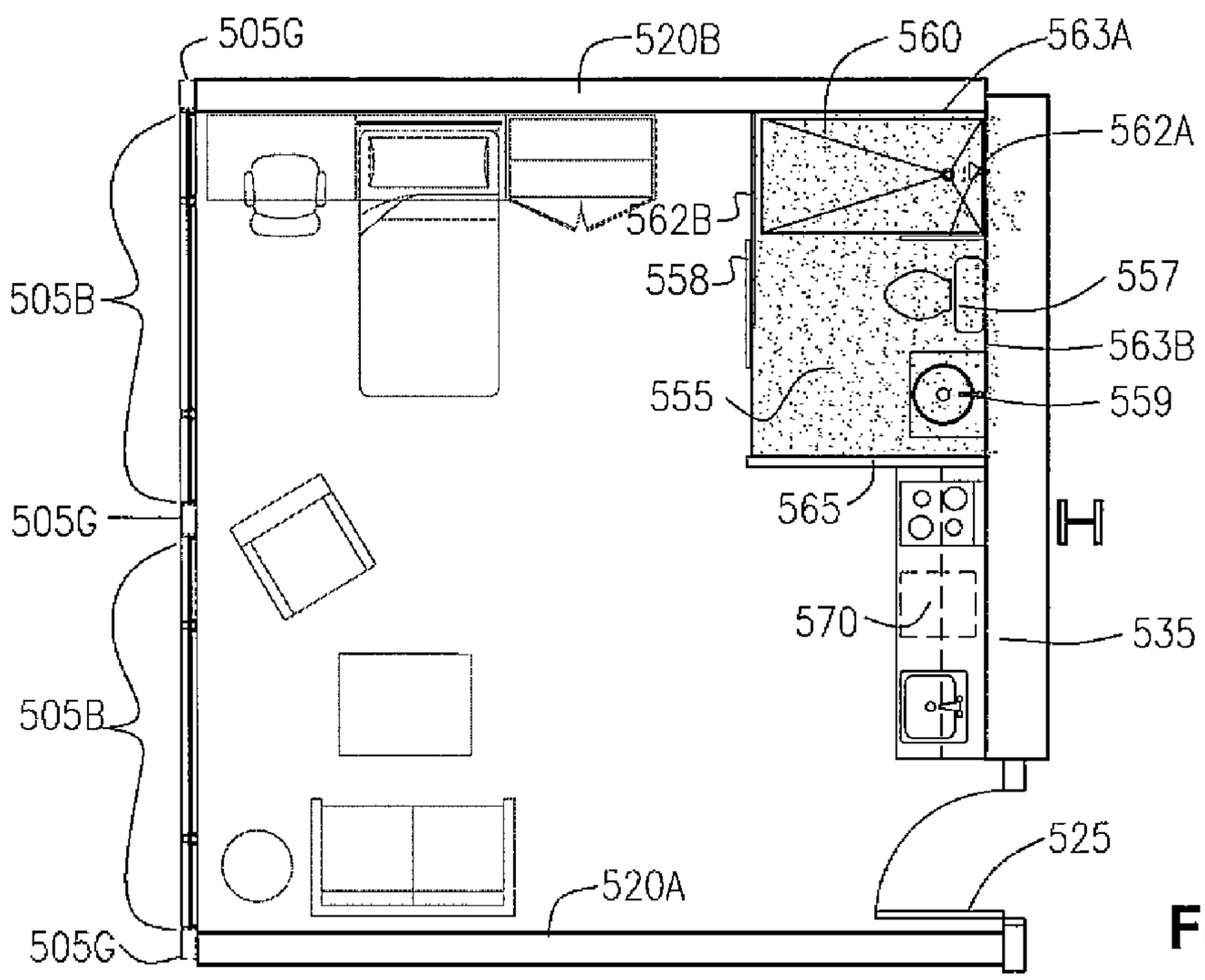


FIG. 10B

COMPONENTS USED TO CREATE A STUDIO UNIT 300B

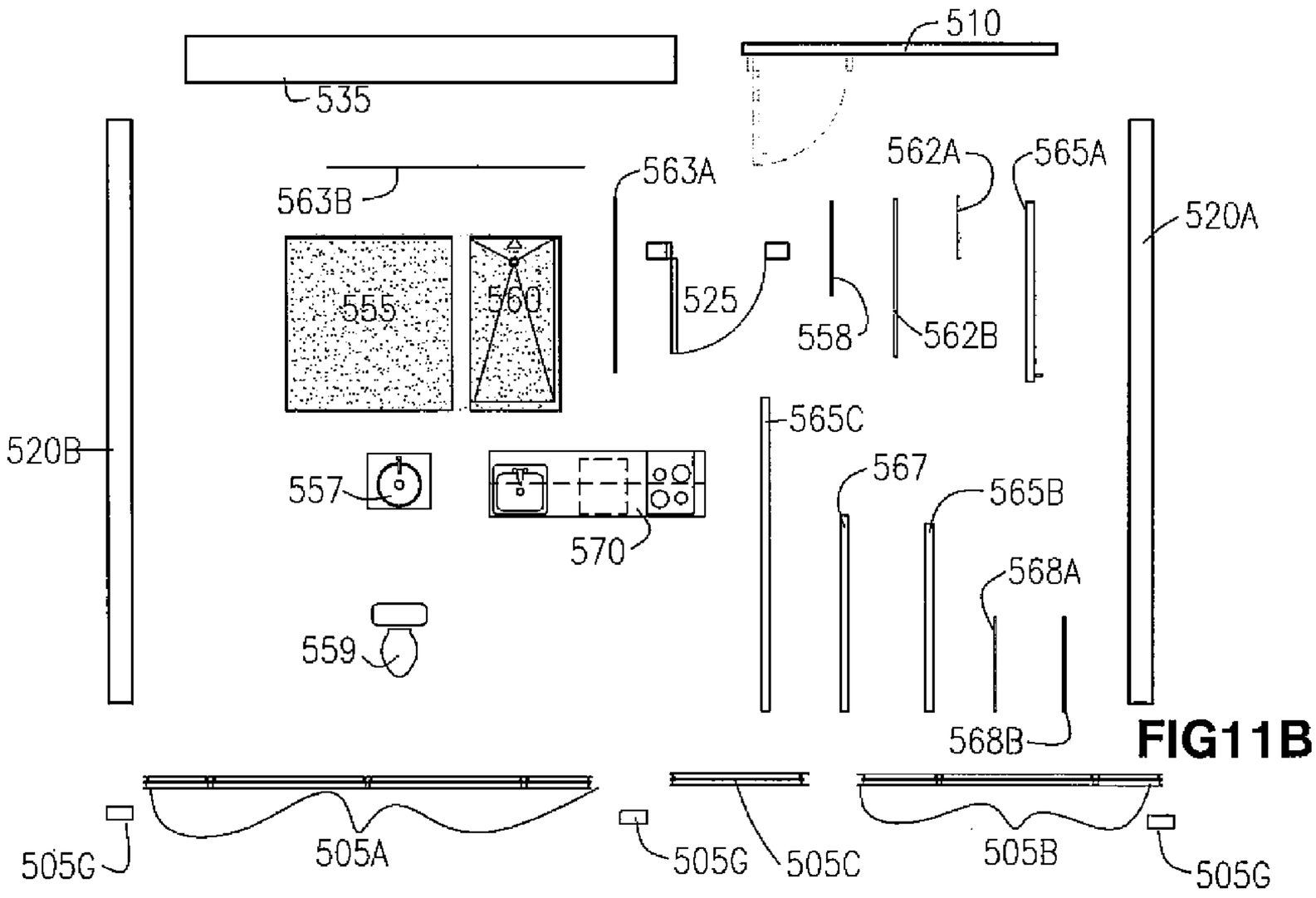


FIG11B

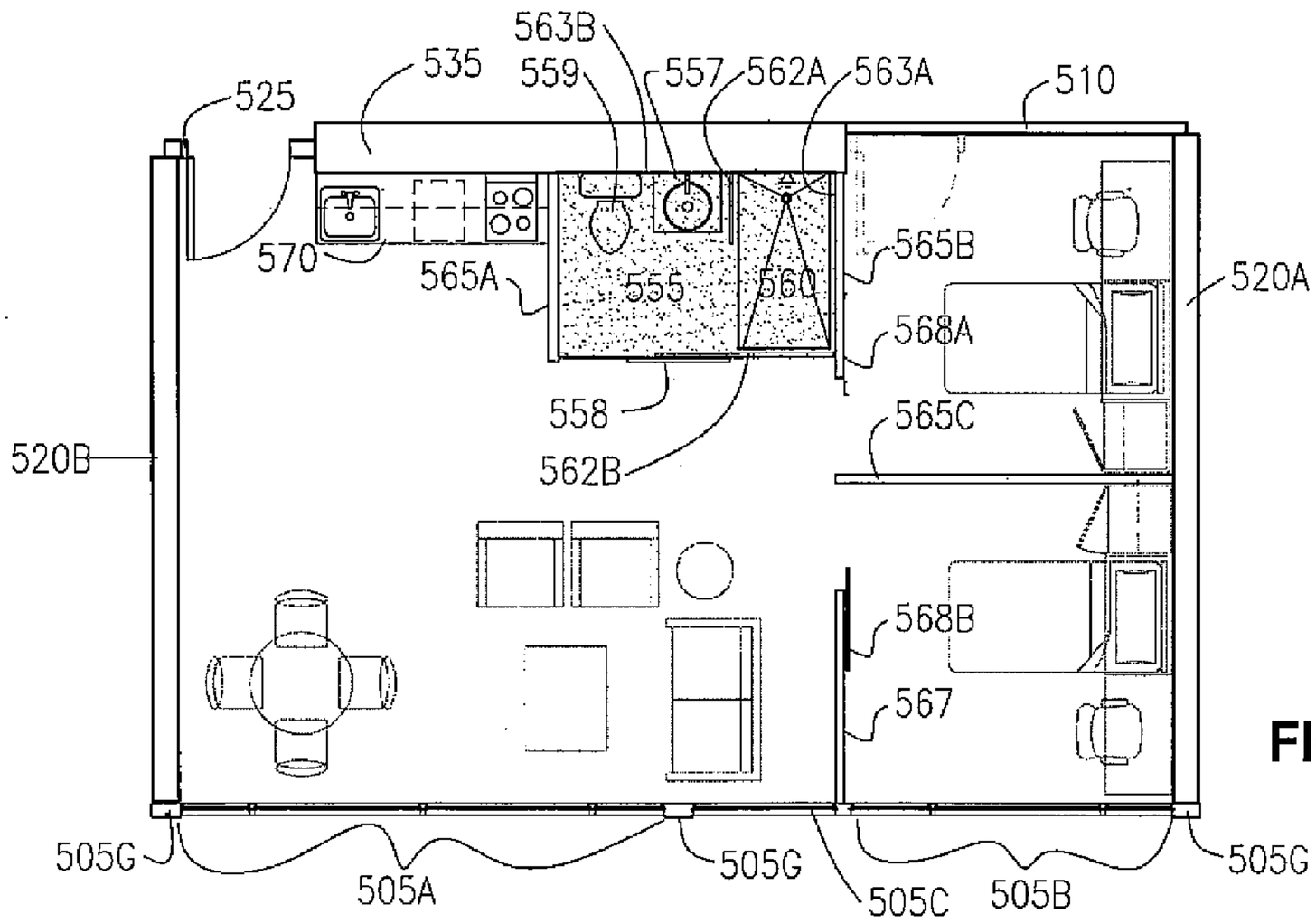


FIG11A

COMPONENTS USED TO CREATE 2-BEDROOM UNIT 300E

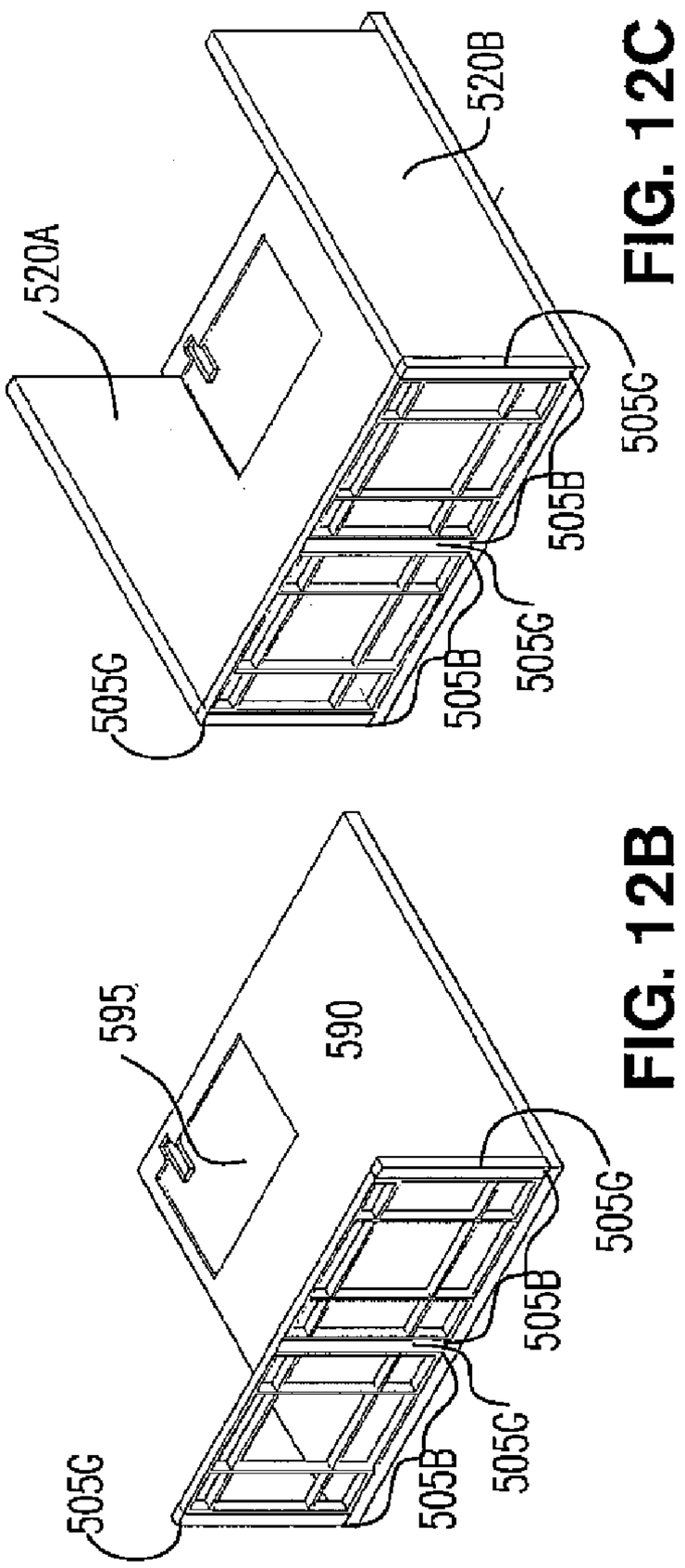


FIG. 12C

FIG. 12B

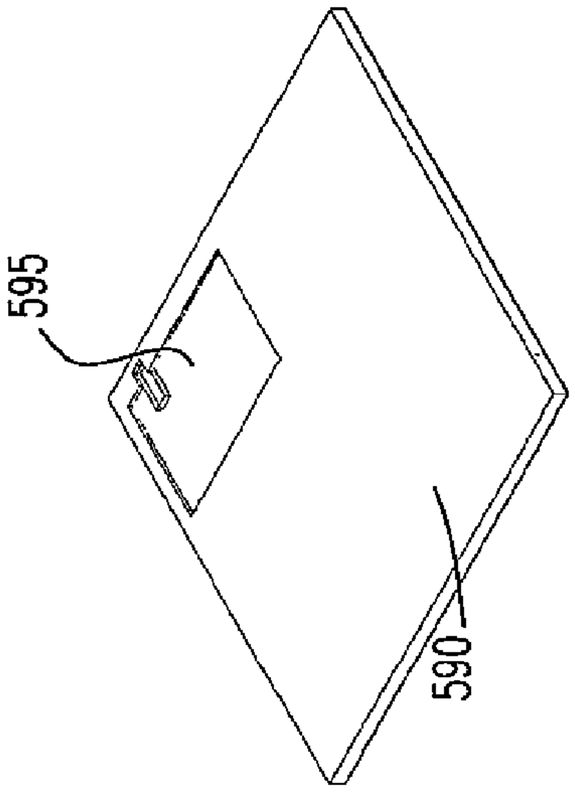


FIG. 12A

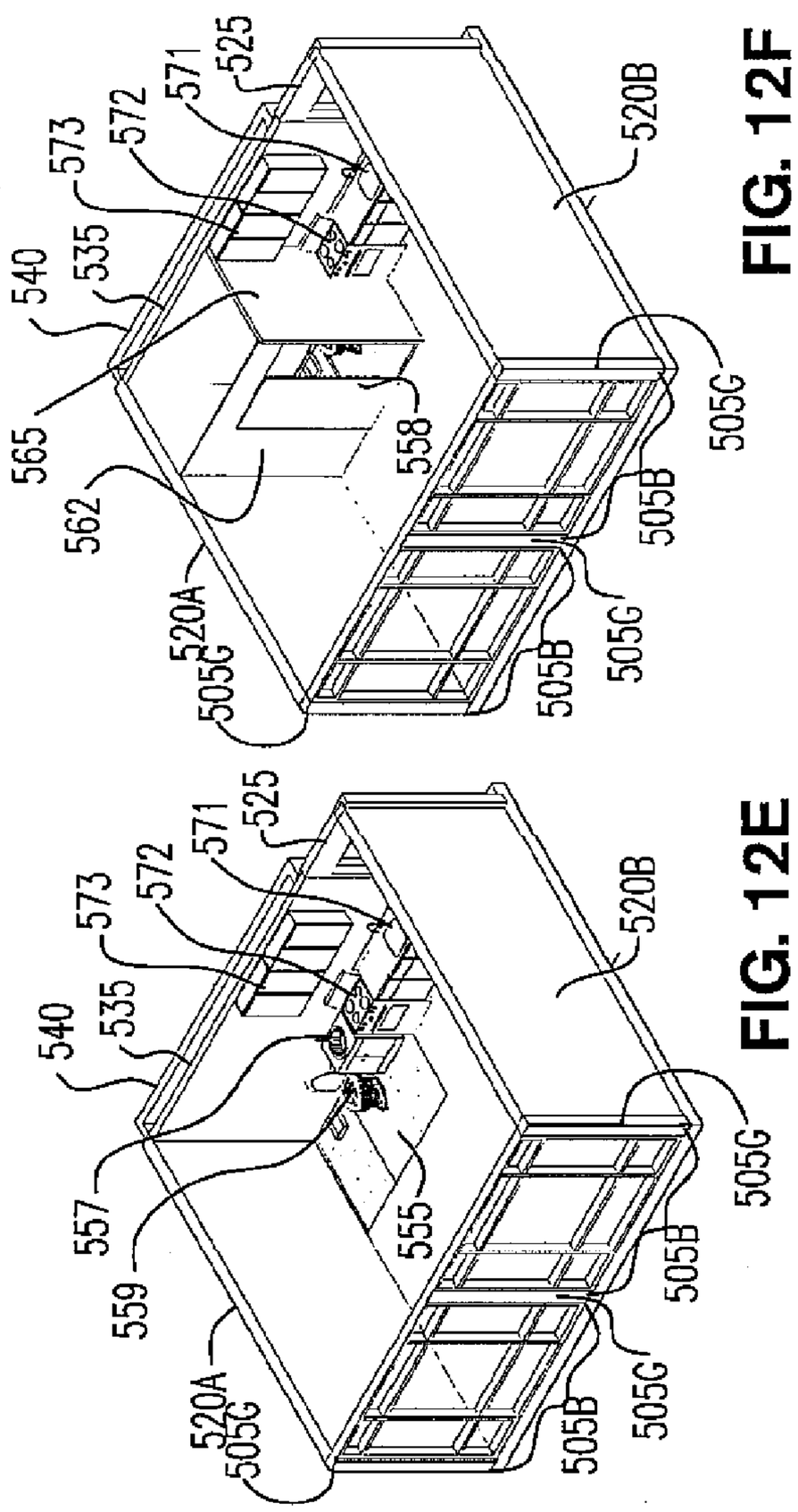


FIG. 12F

FIG. 12E

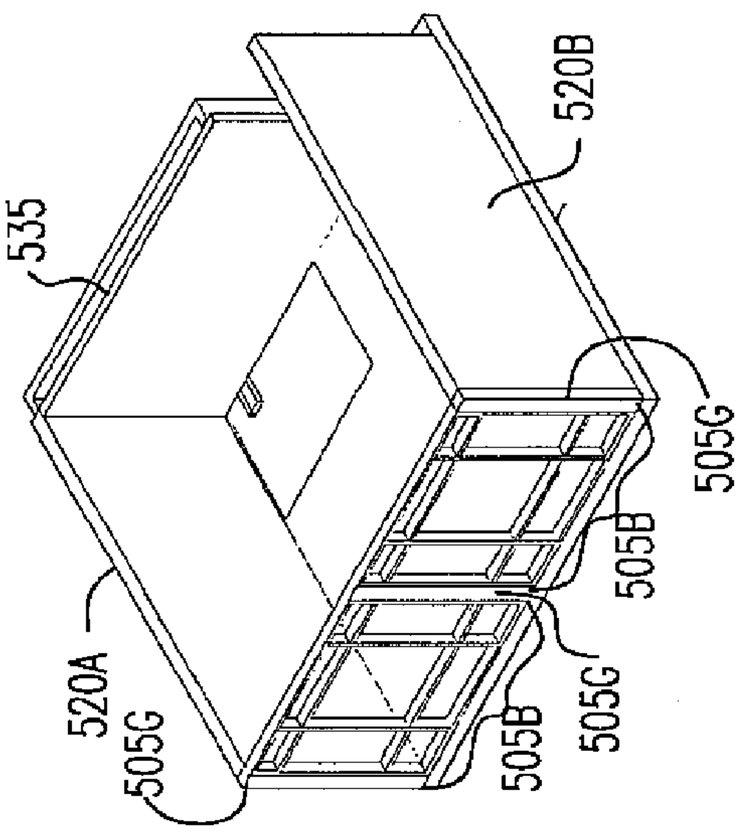


FIG. 12D

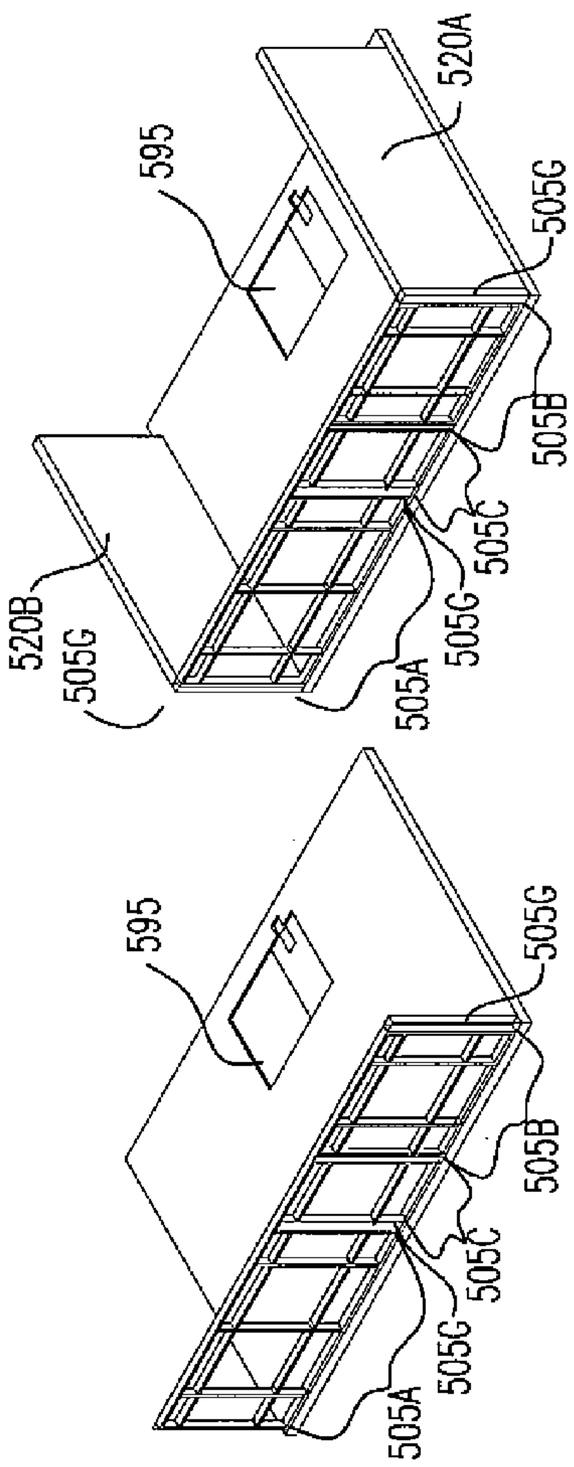


FIG. 13C

FIG. 13B

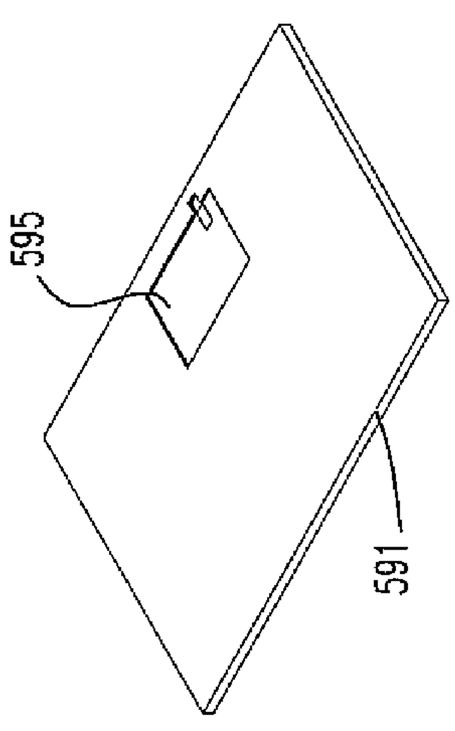


FIG. 13A

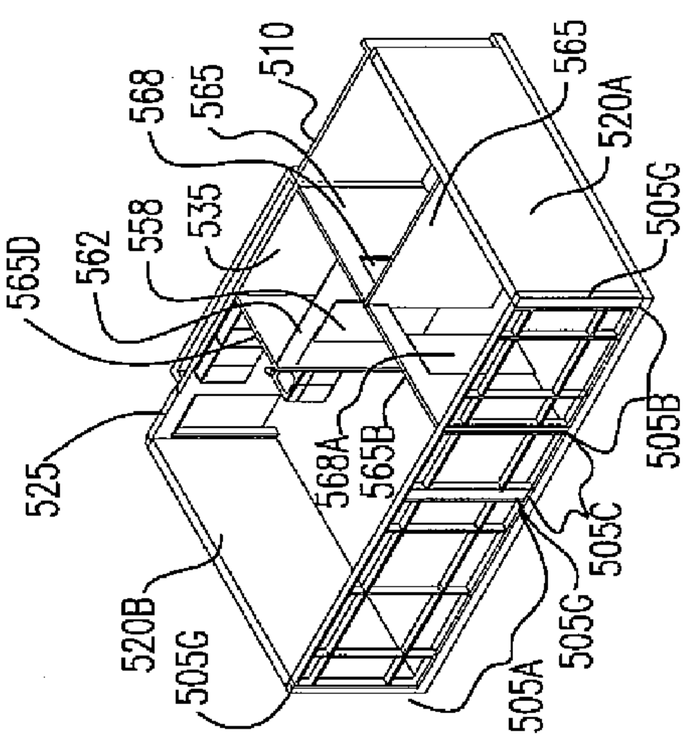


FIG. 13F

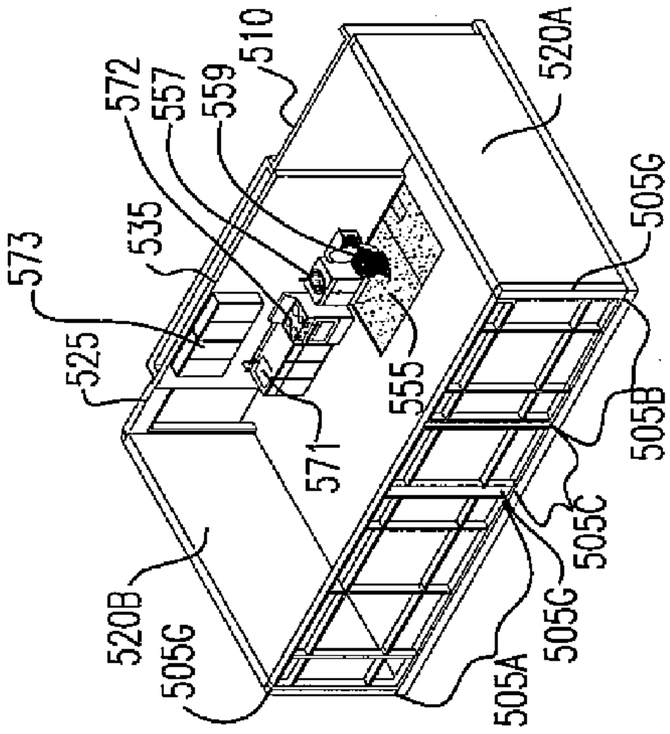


FIG. 13E

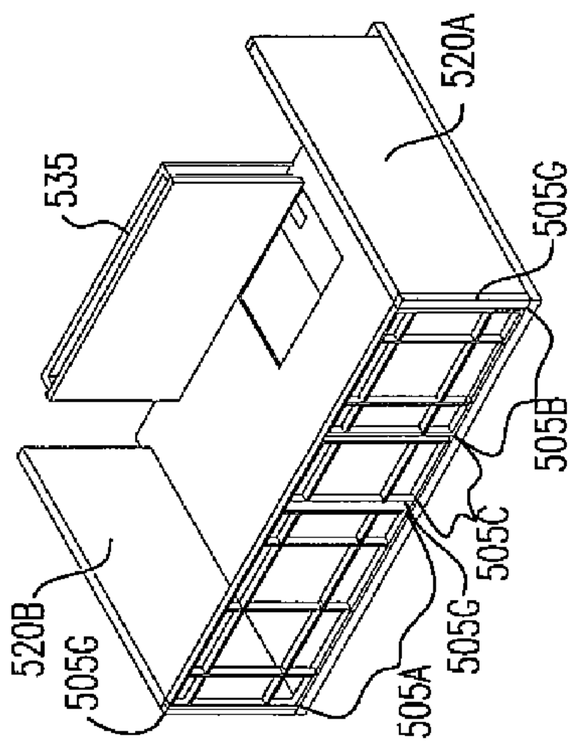


FIG. 13D

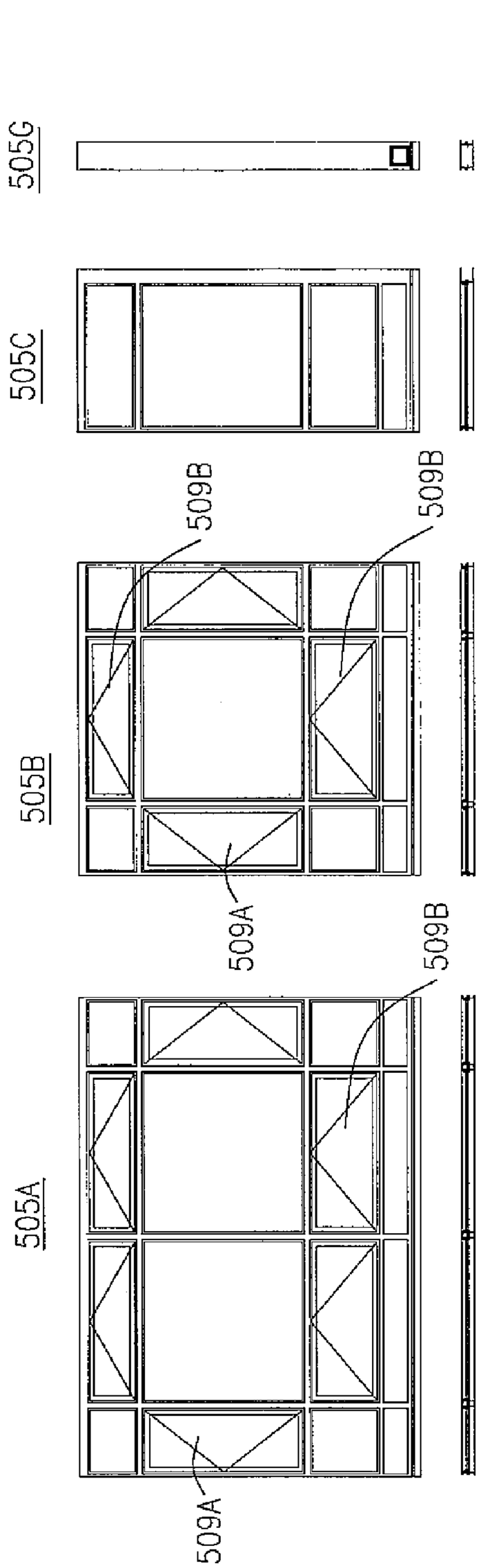


FIG. 14A FIG. 14B FIG. 14C FIG. 14G

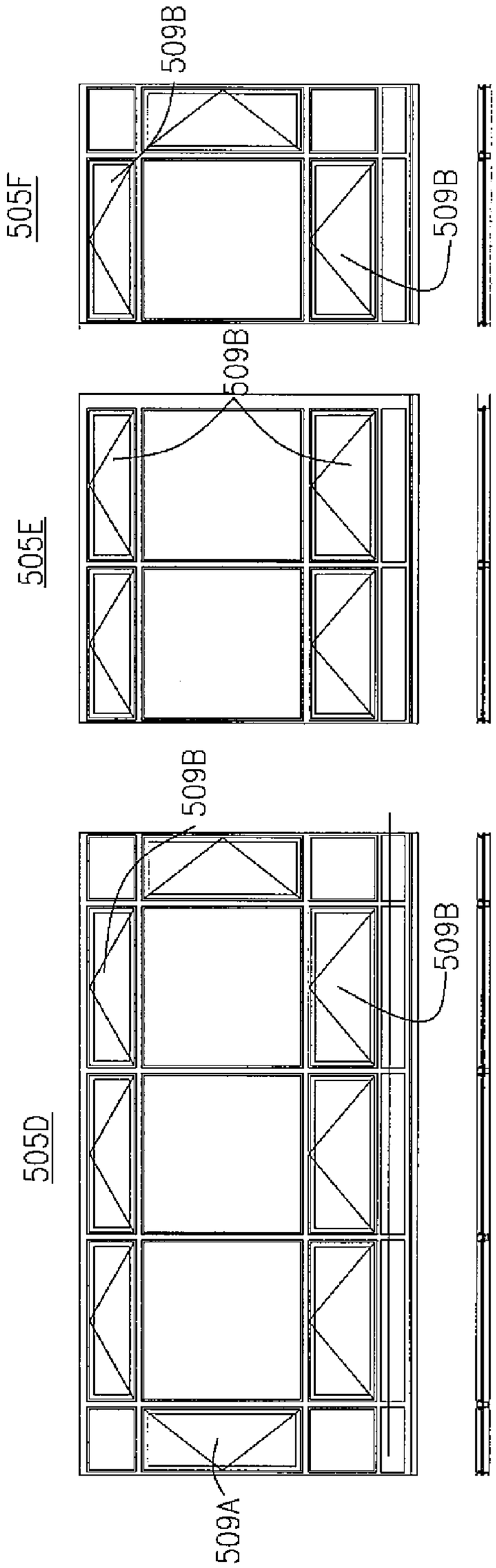


FIG. 14D FIG. 14E FIG. 14F

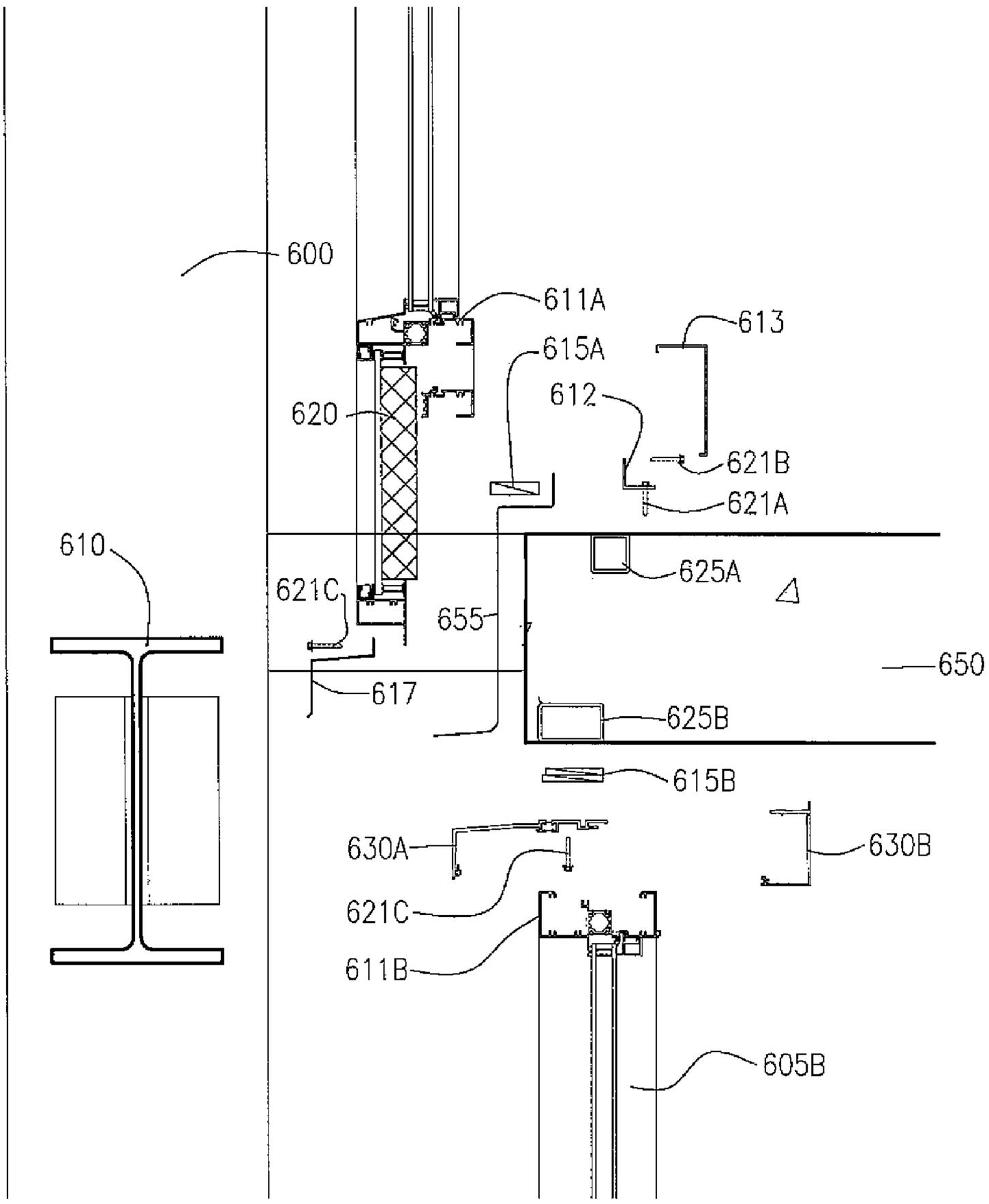
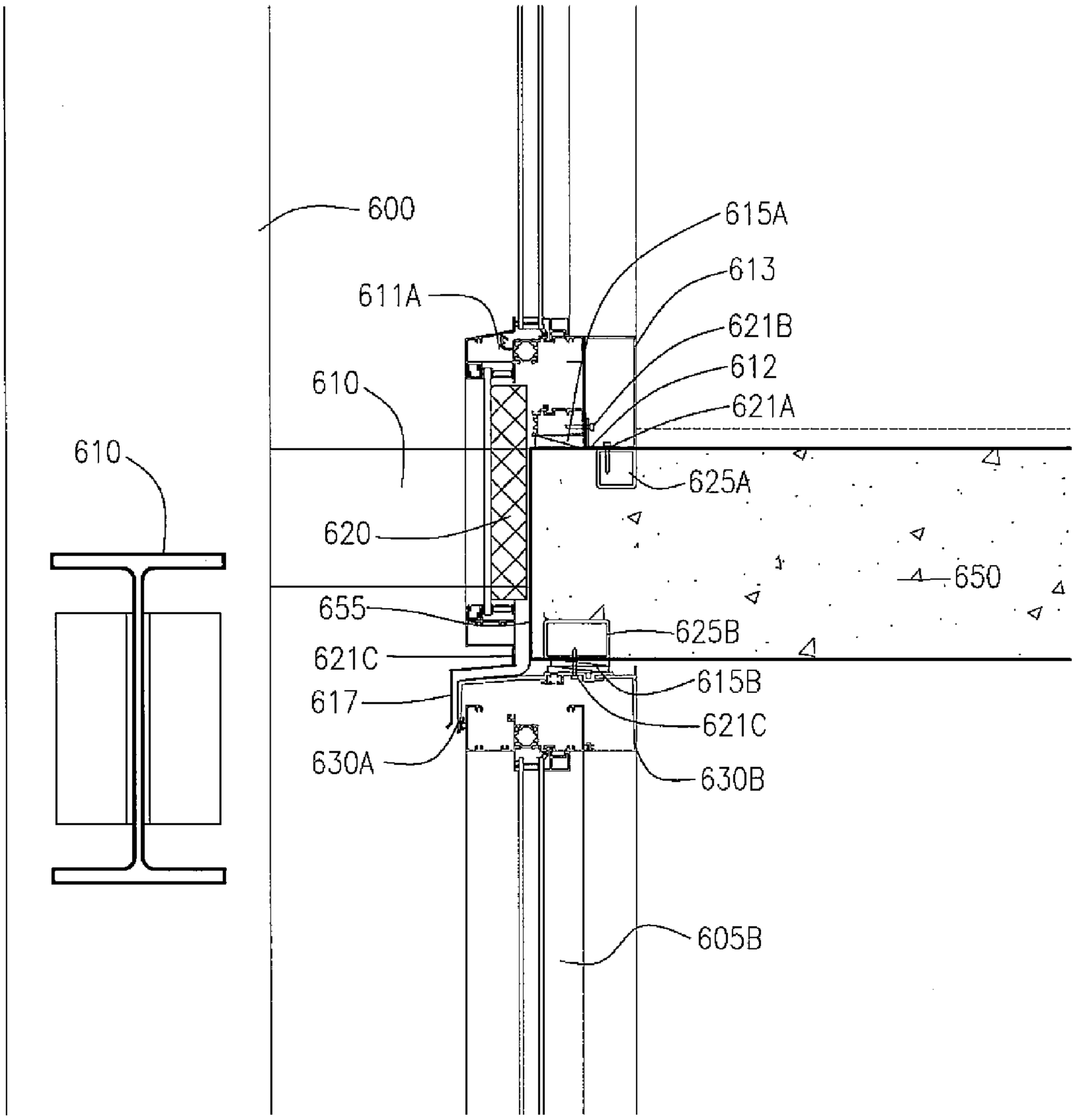

600
611A
613
615A
612
620
621B
621A
610
625A
621C
655
650
617
625B
615B
630A
630B
621C
611B
605B

FIG. 15


600
611A
610
620
655
621C
617
630A
615A
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621B
612
621A
625A
650
625B
615B
621C
630B
605B
610

FIG. 16

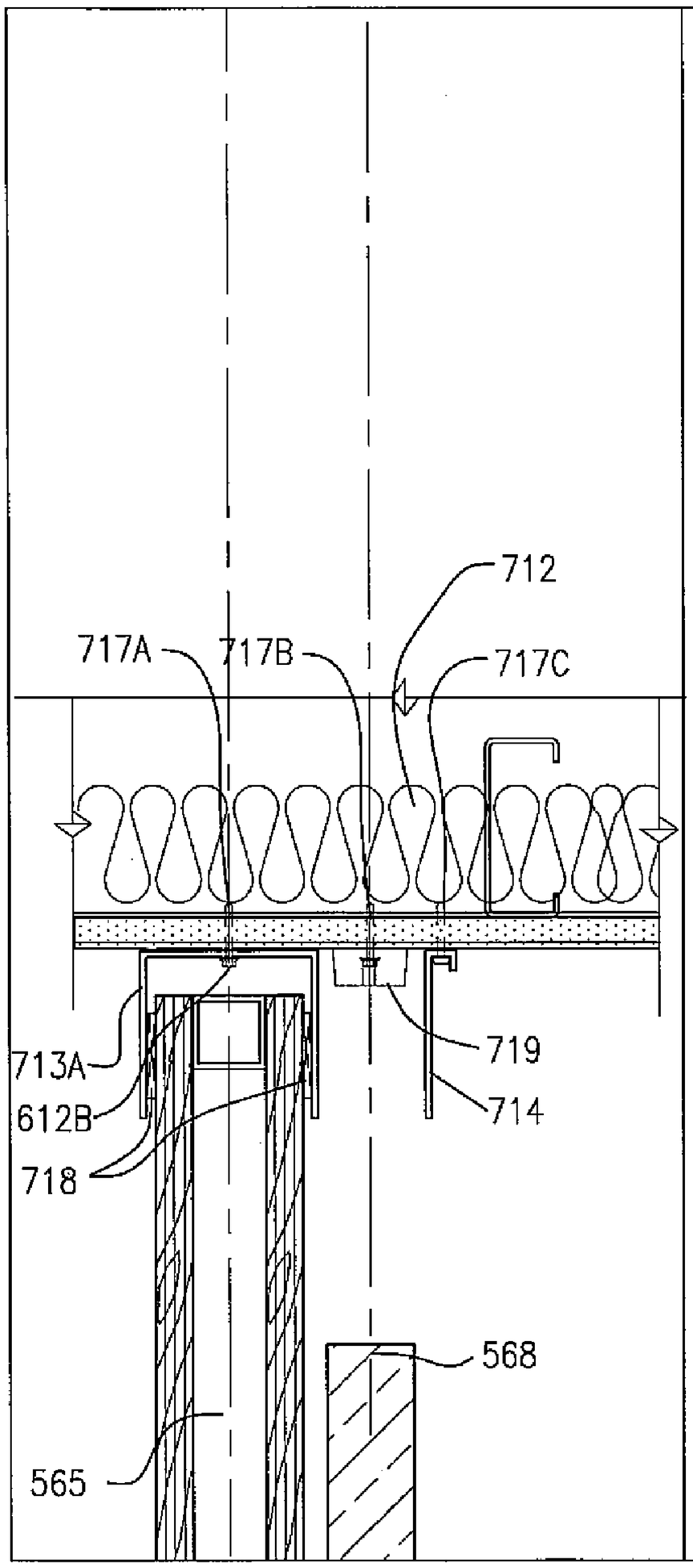


FIG. 17A

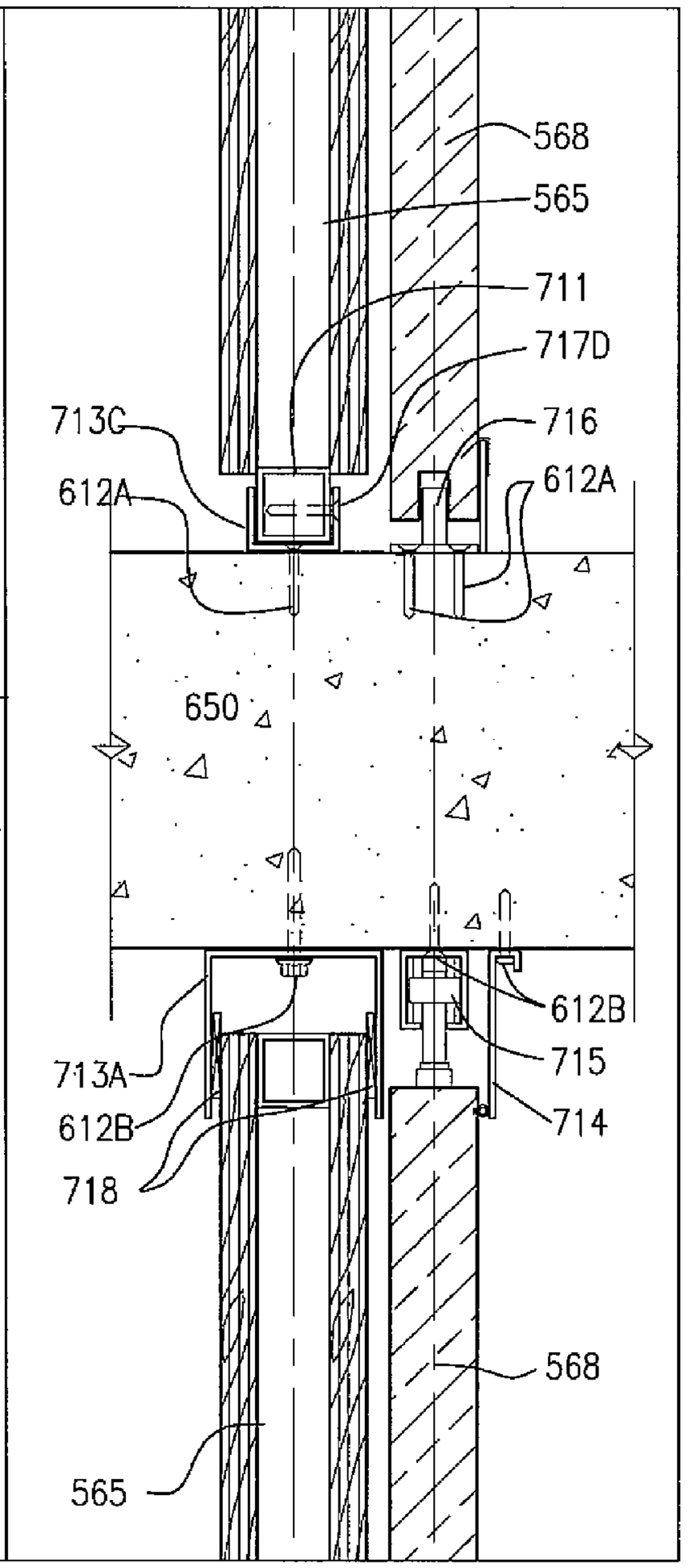


FIG. 17B

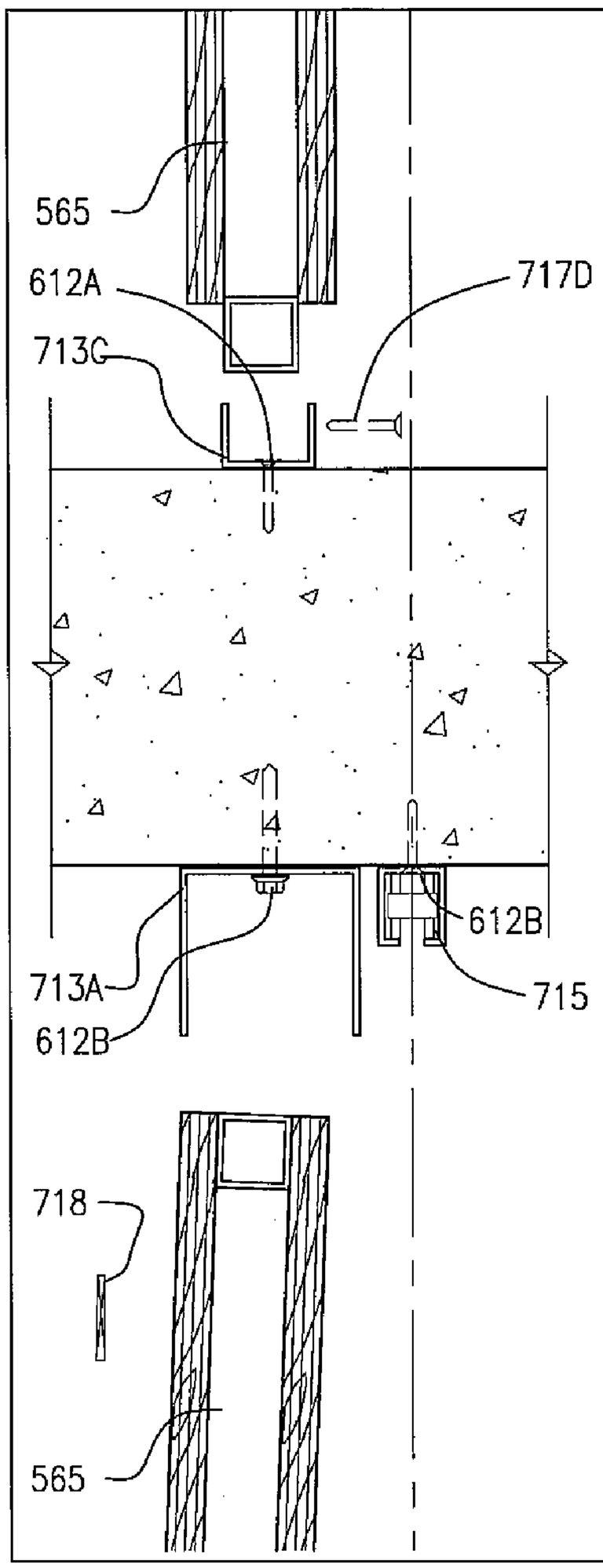


FIG. 18A

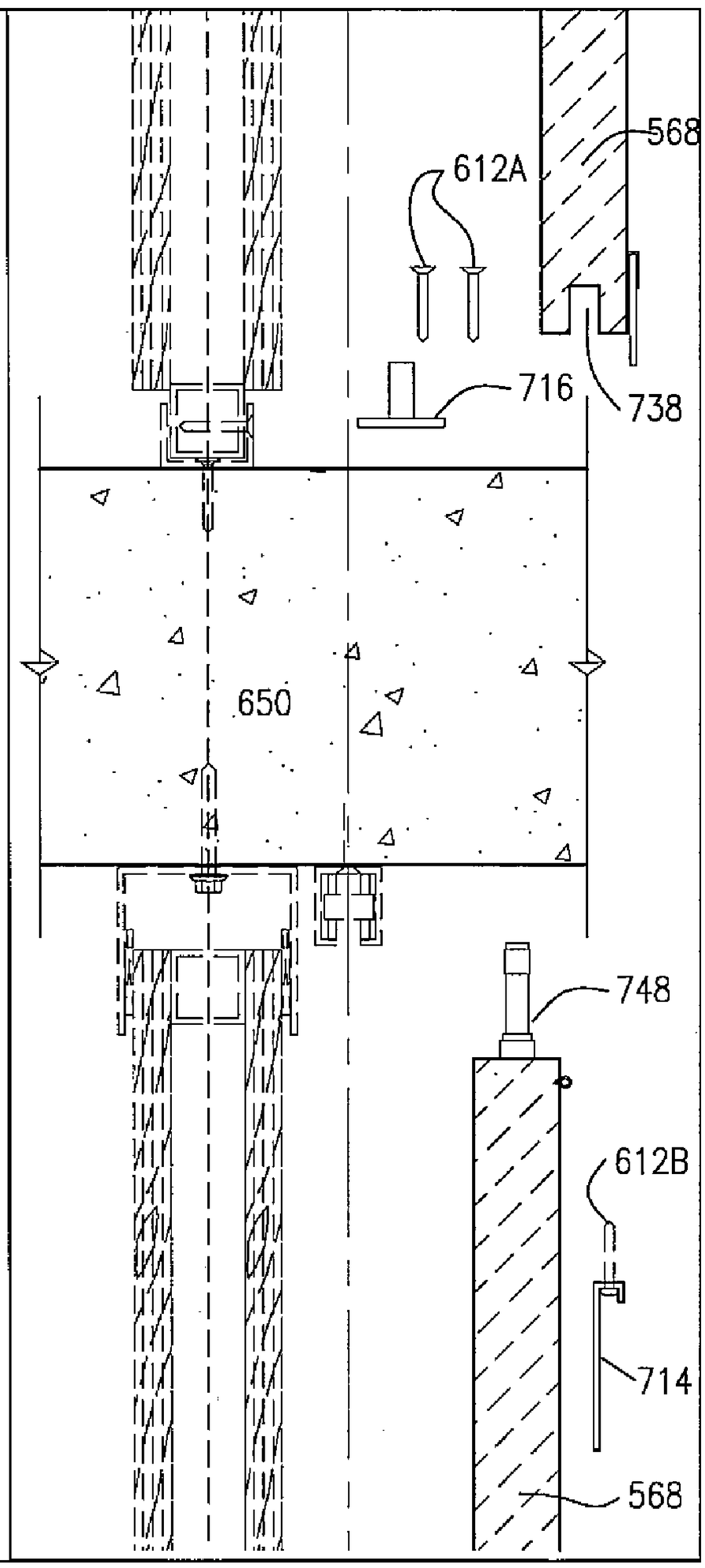


FIG. 18B

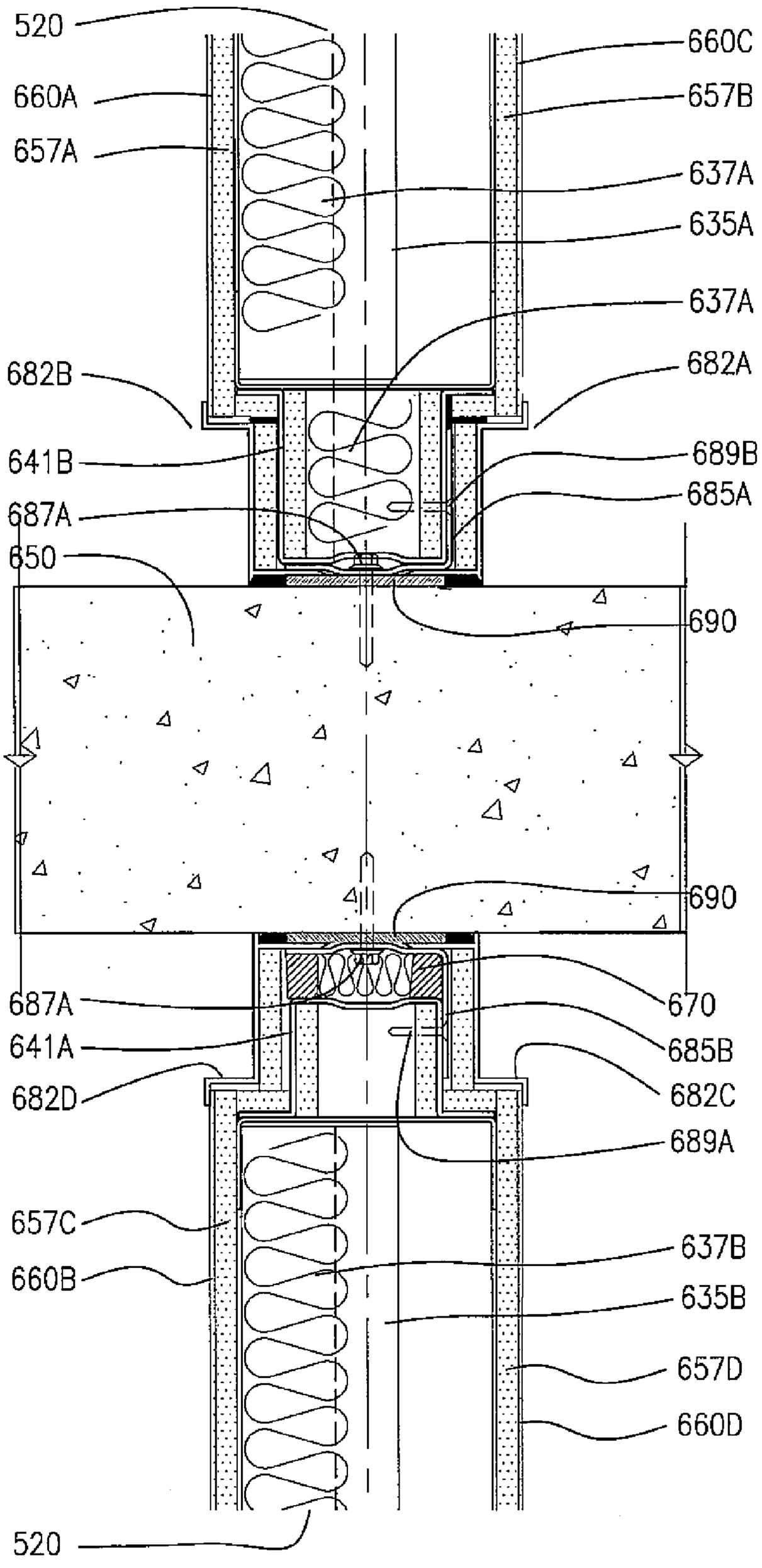

520
660A
657A
682B
641B
687A
650
687A
641A
682D
657C
660B
520
660C
657B
637A
635A
637A
682A
689B
685A
690
690
670
685B
682C
689A
637B
635B
657D
660D

FIG. 19

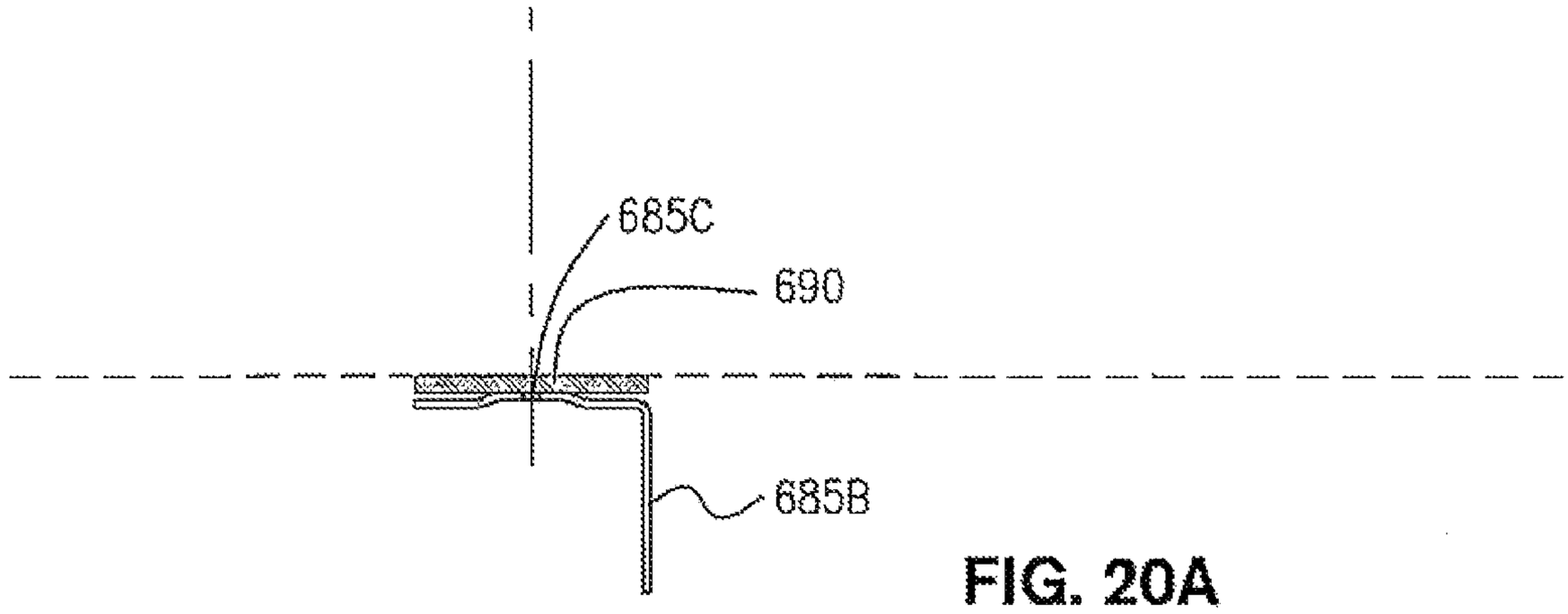


FIG. 20A

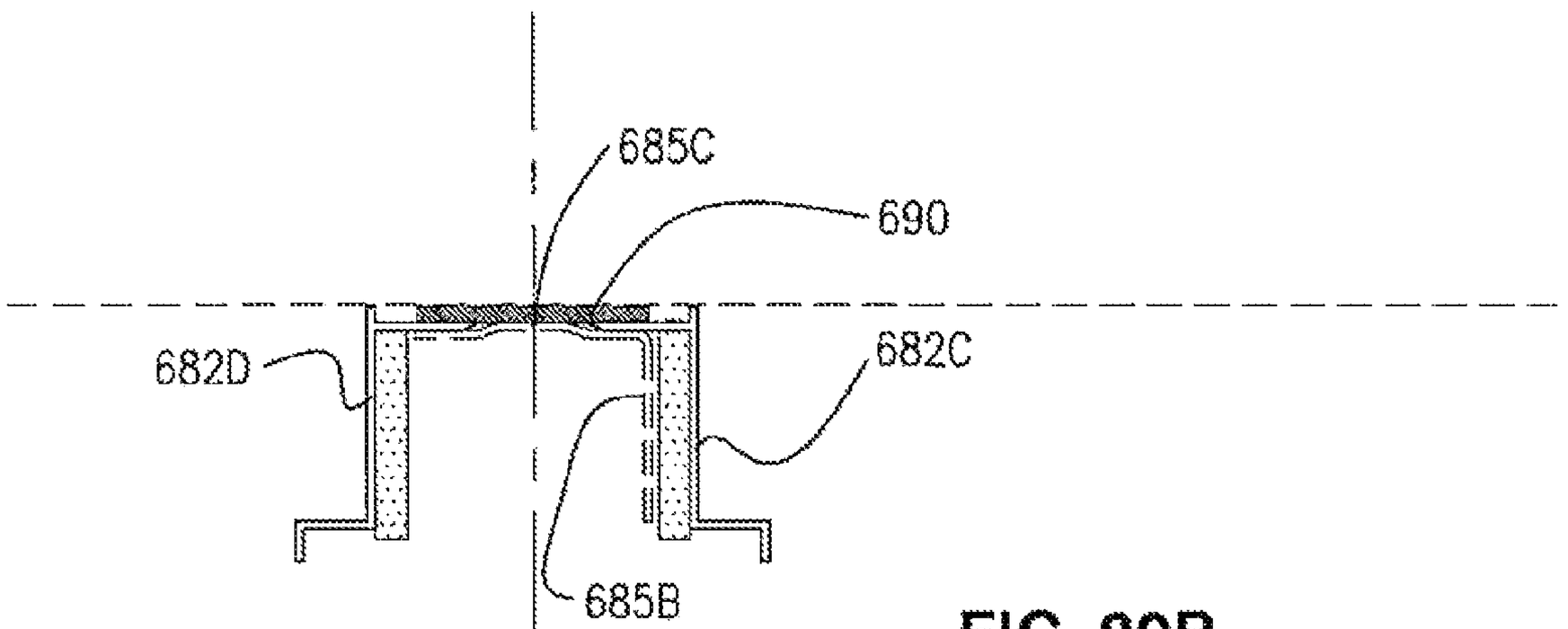


FIG. 20B

FIG. 20C

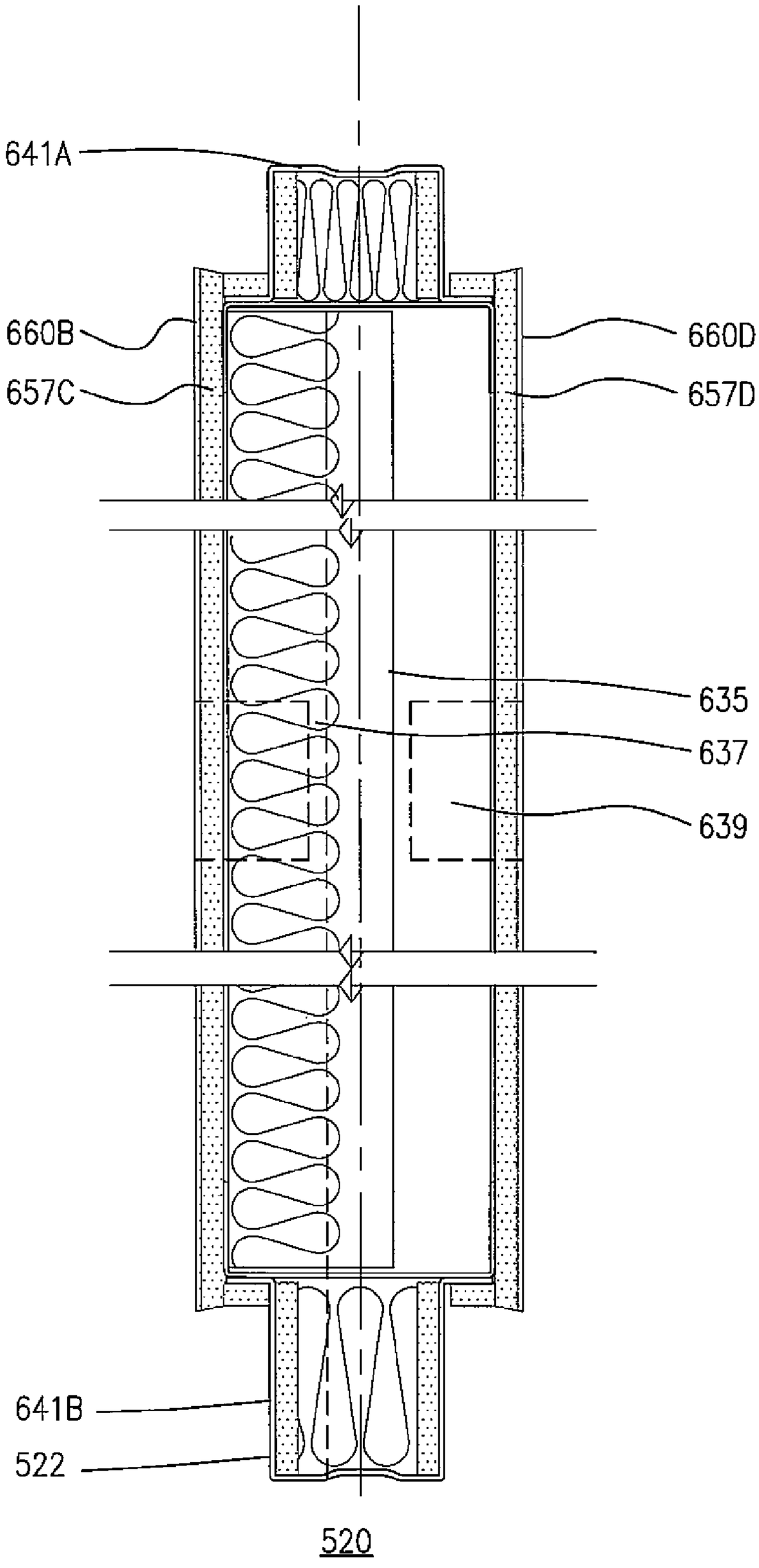


FIG. 21

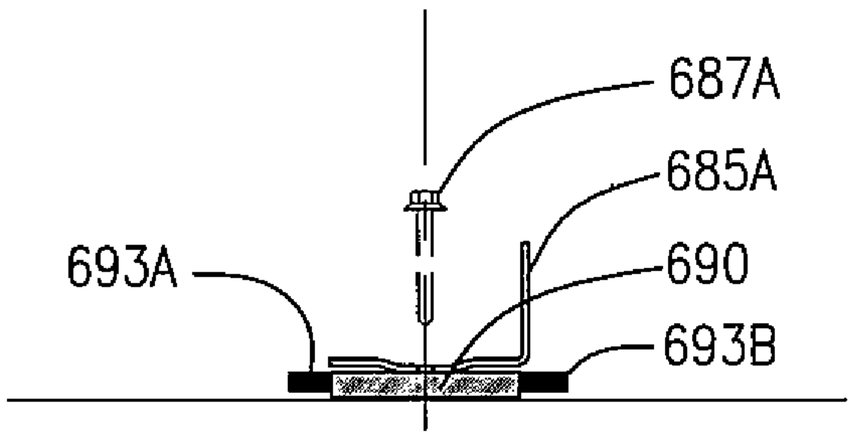


FIG. 22A

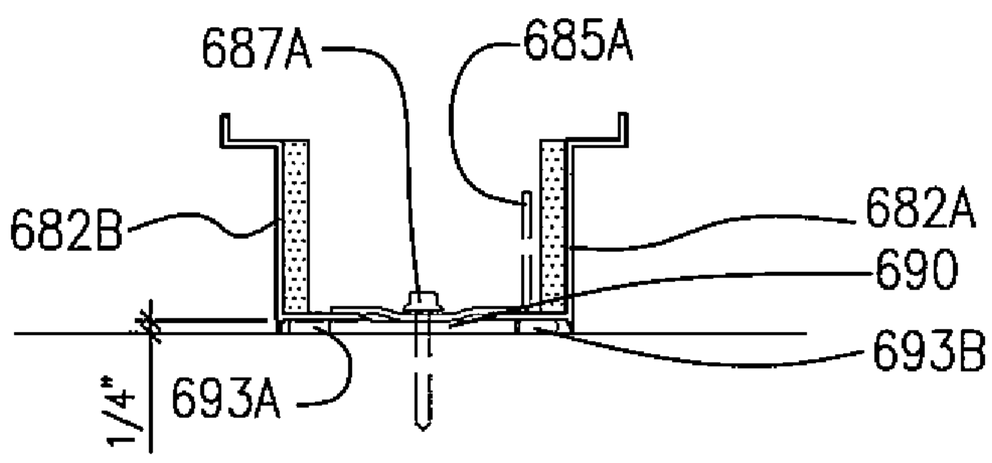


FIG. 22B

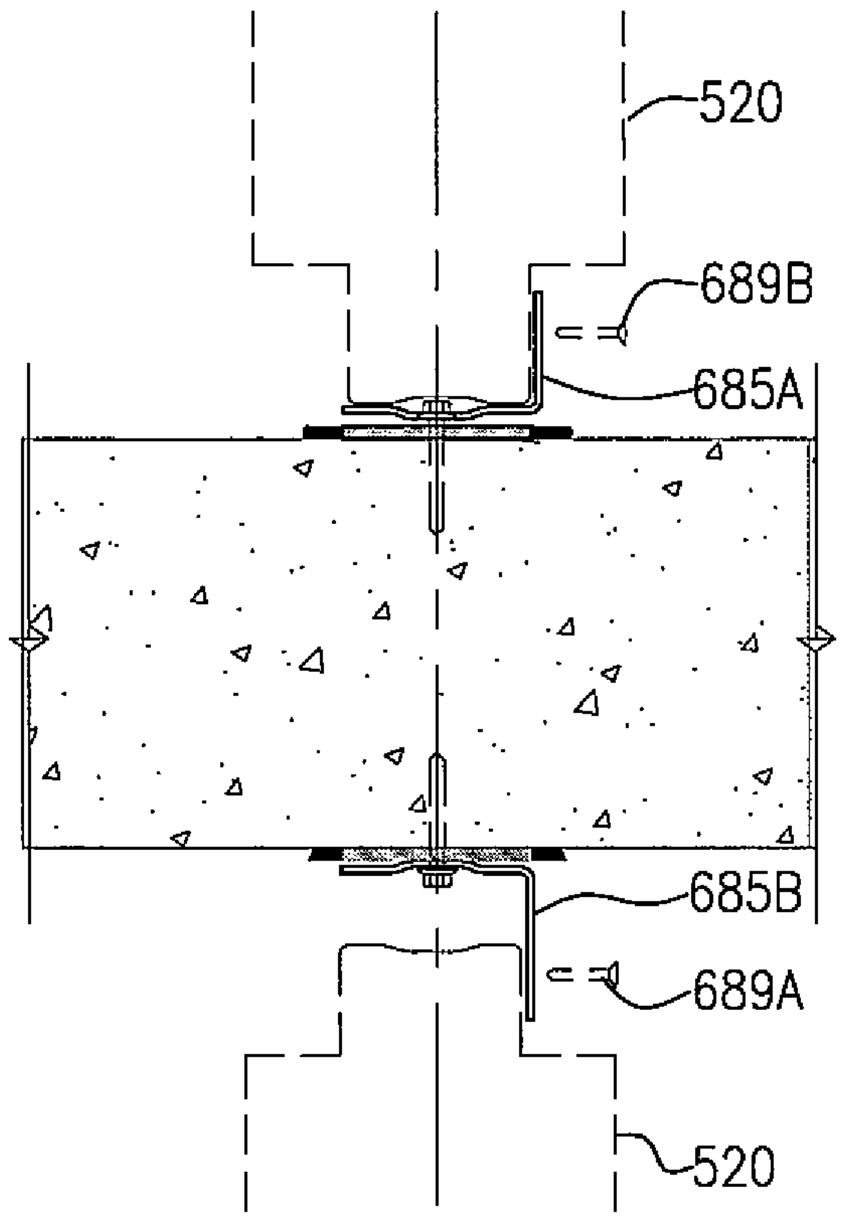


FIG. 22C

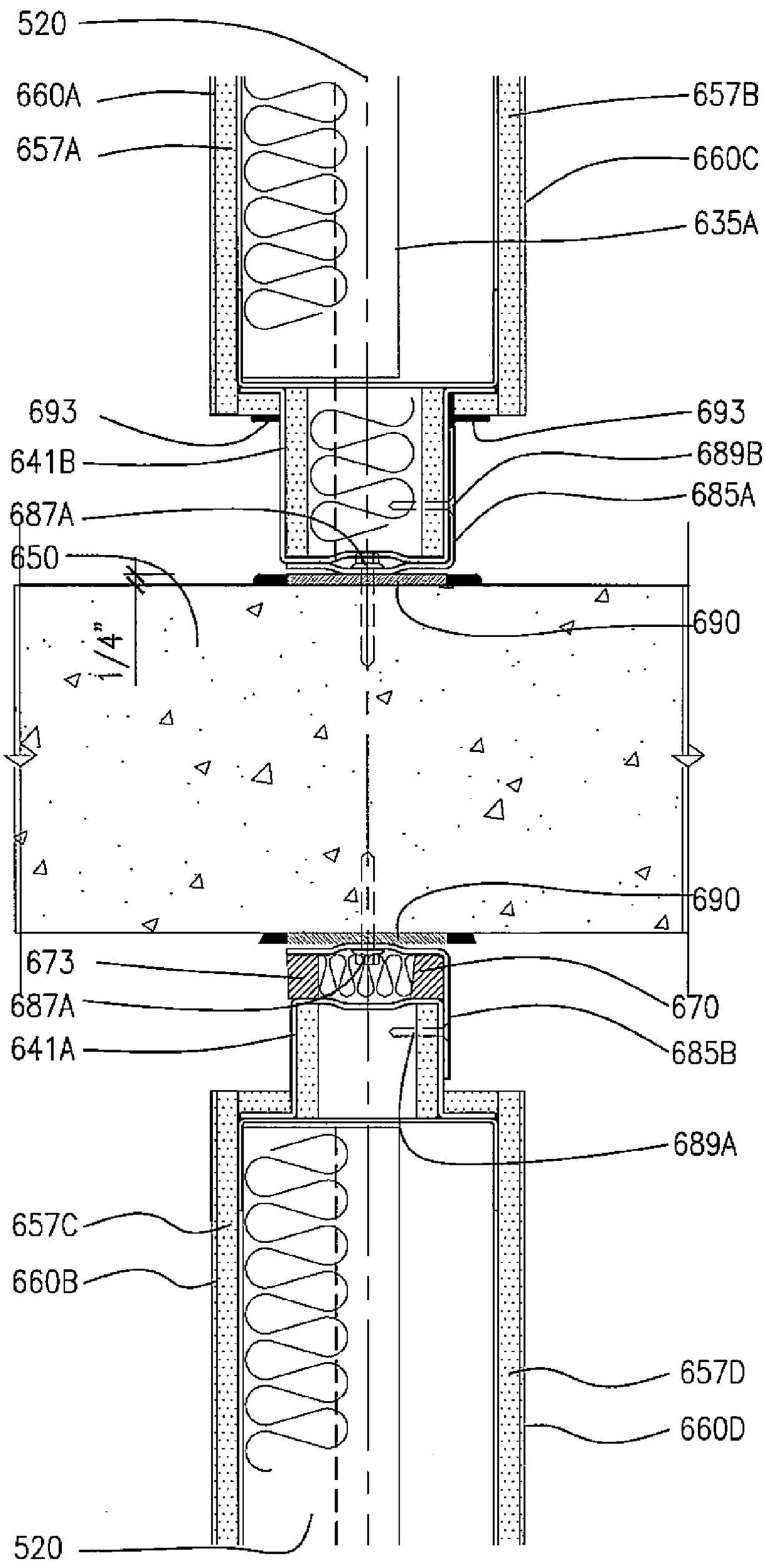

520
660A
657A
657B
660C
635A
693
641B
687A
650
693
689B
685A
1/4"
690
690
673
687A
641A
670
685B
689A
657C
660B
657D
660D
520

FIG. 23

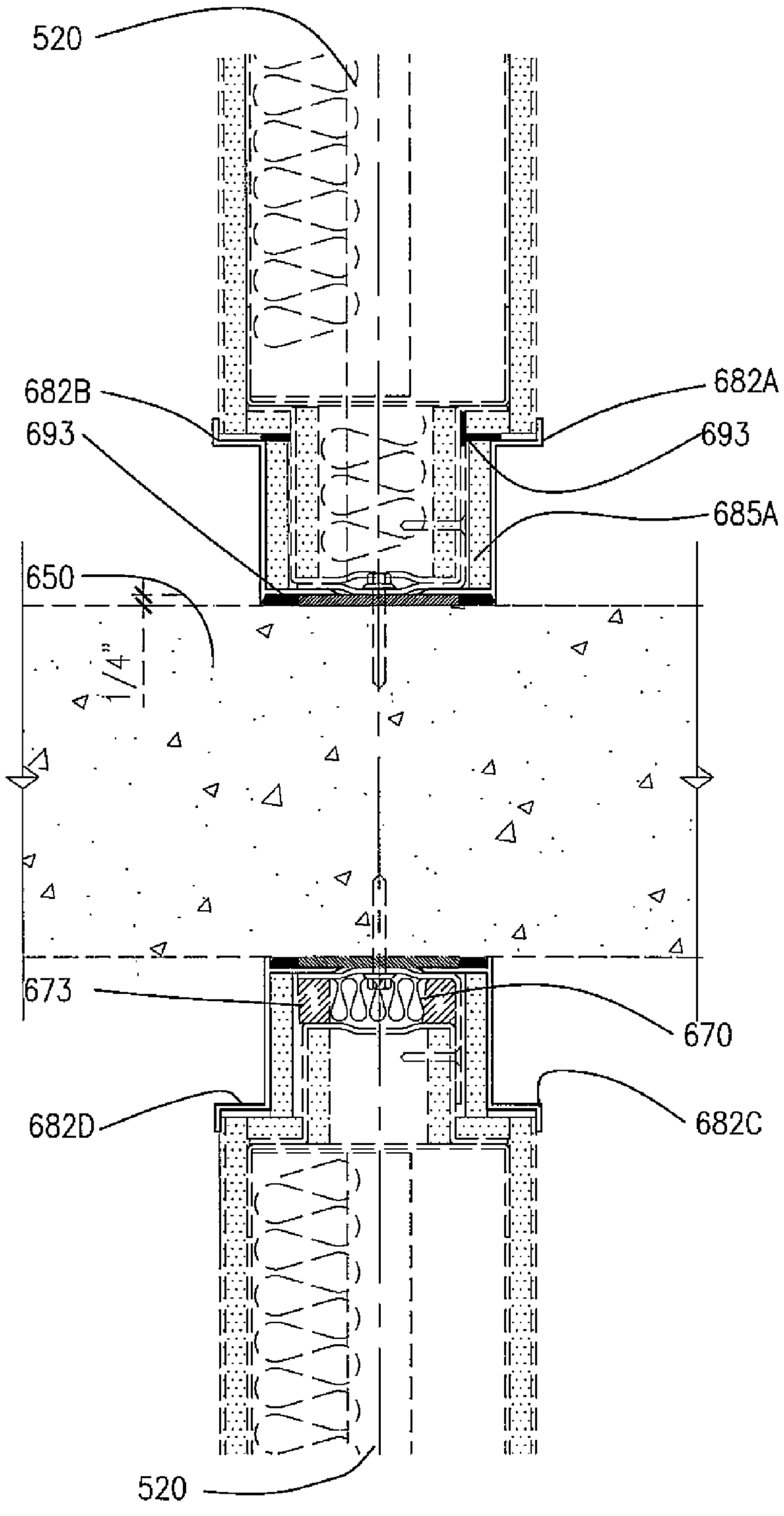


FIG. 24

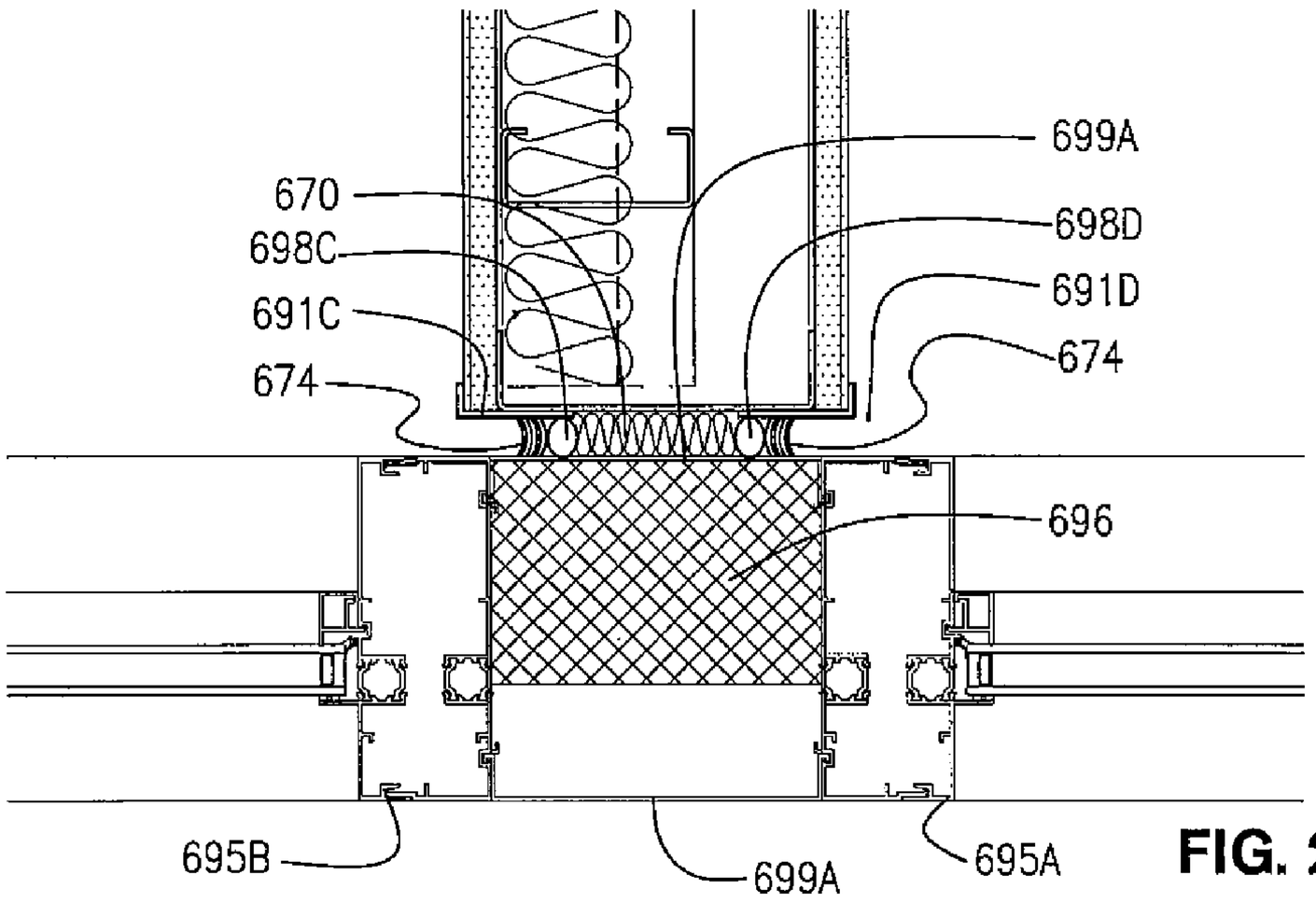


FIG. 25A

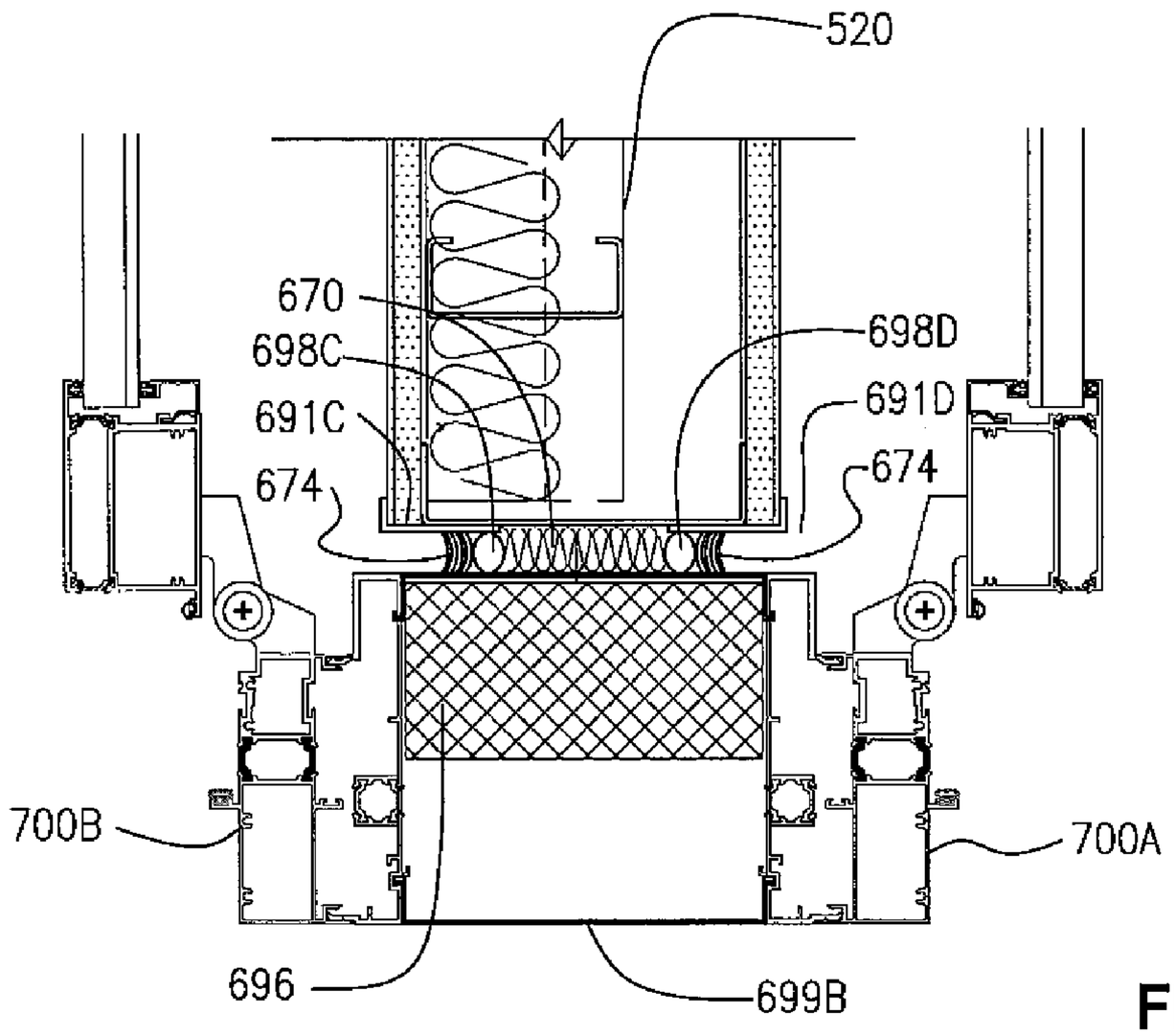
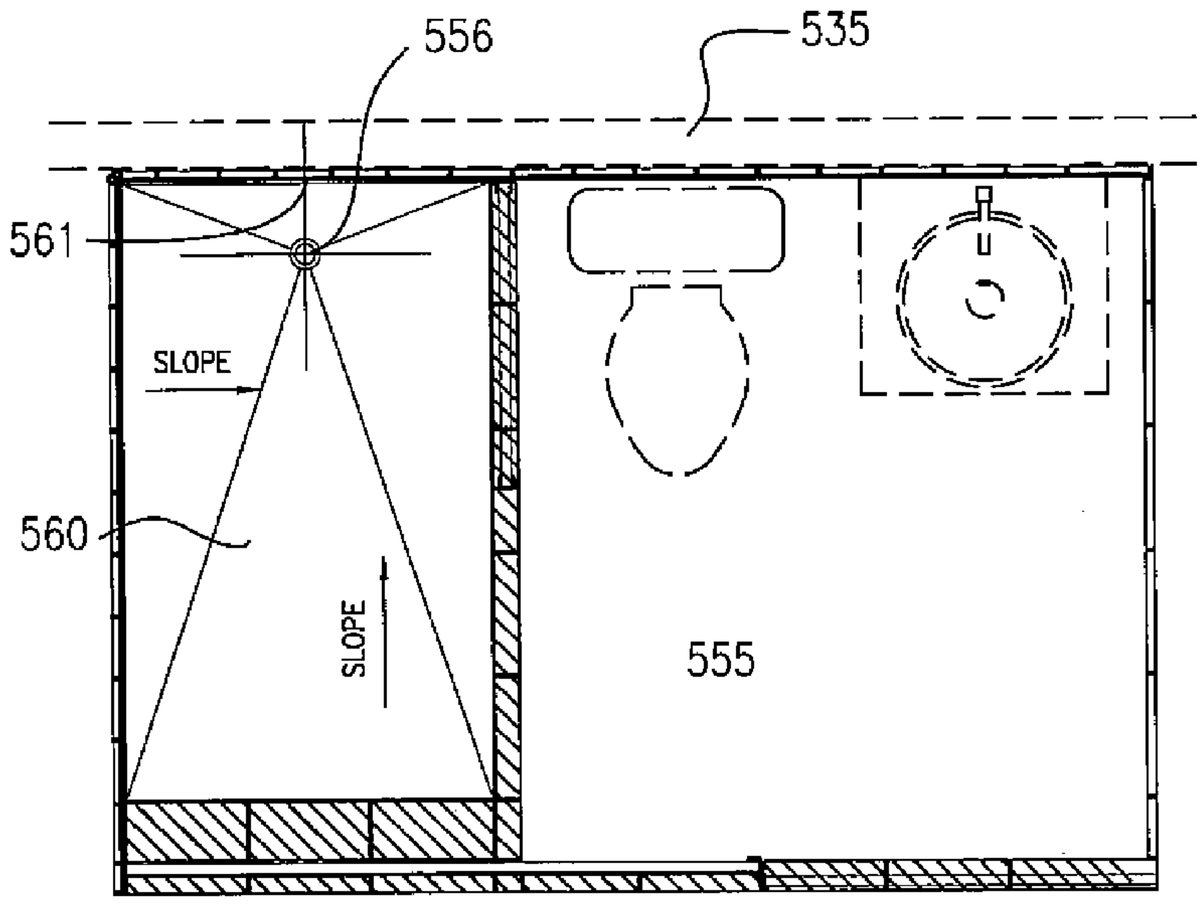
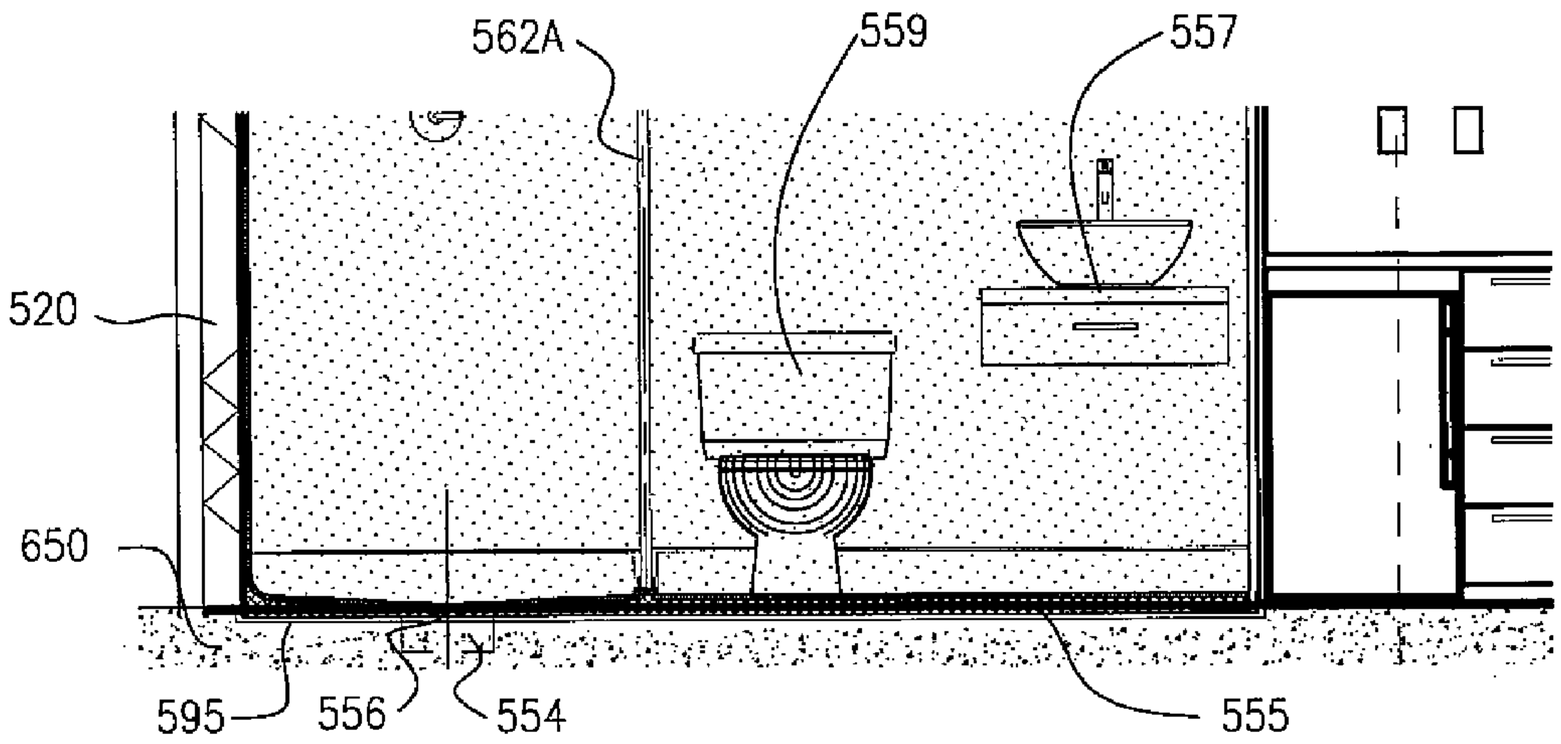


FIG. 25B



FLOOR PLAN

FIG. 26A



ELEVATION VIEW

FIG. 26B

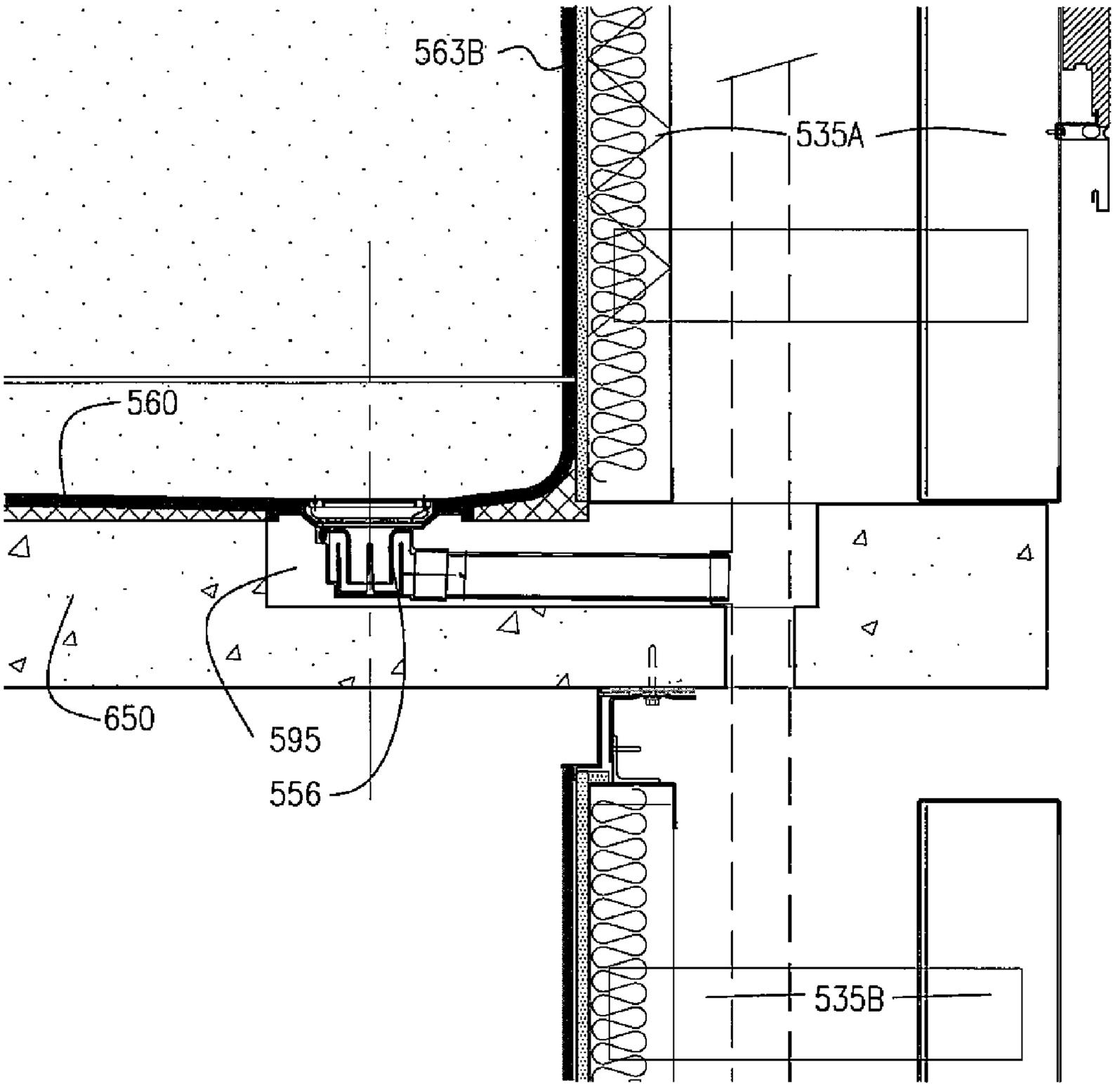


FIG. 27

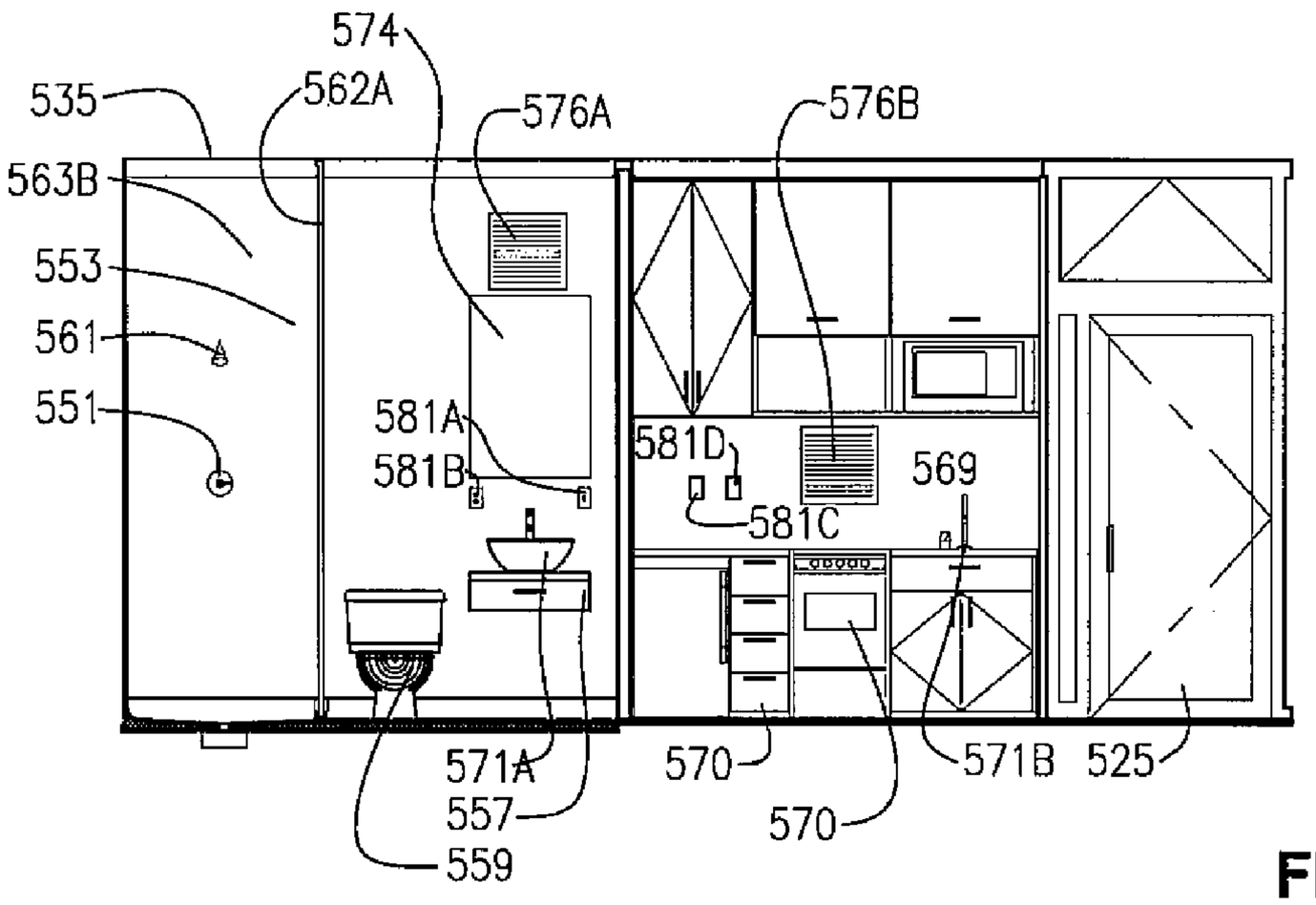


FIG. 28B

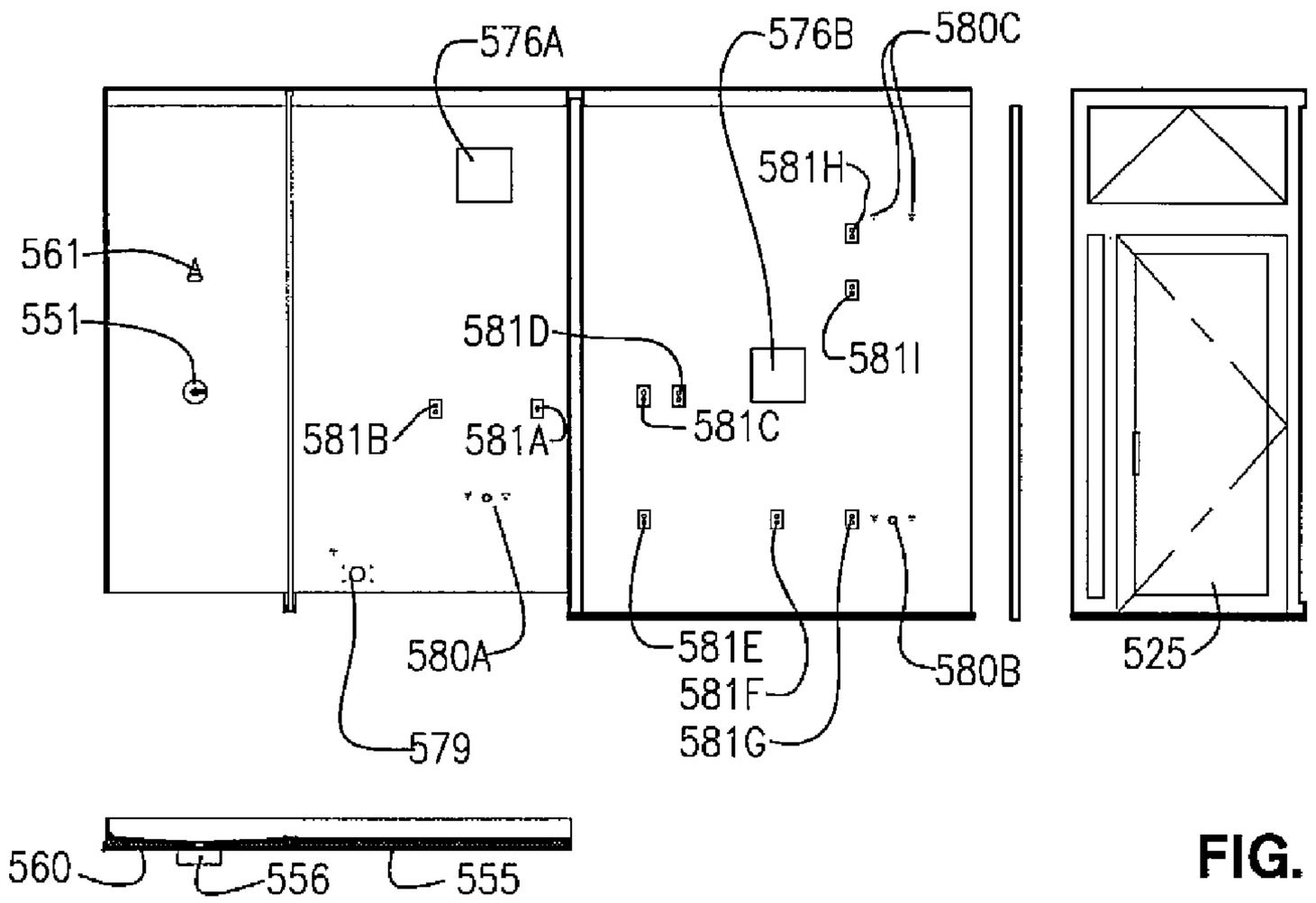


FIG. 28A

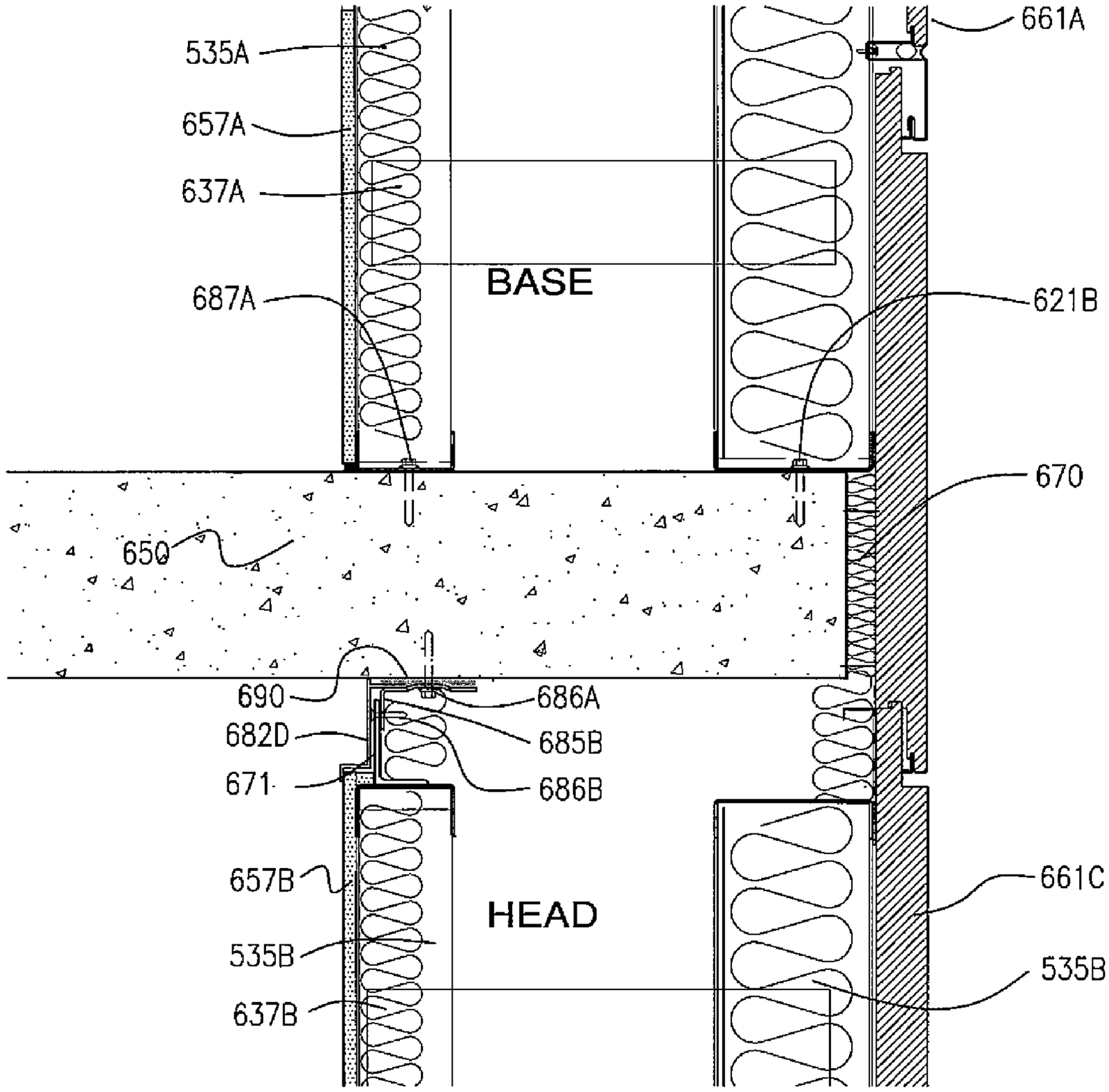
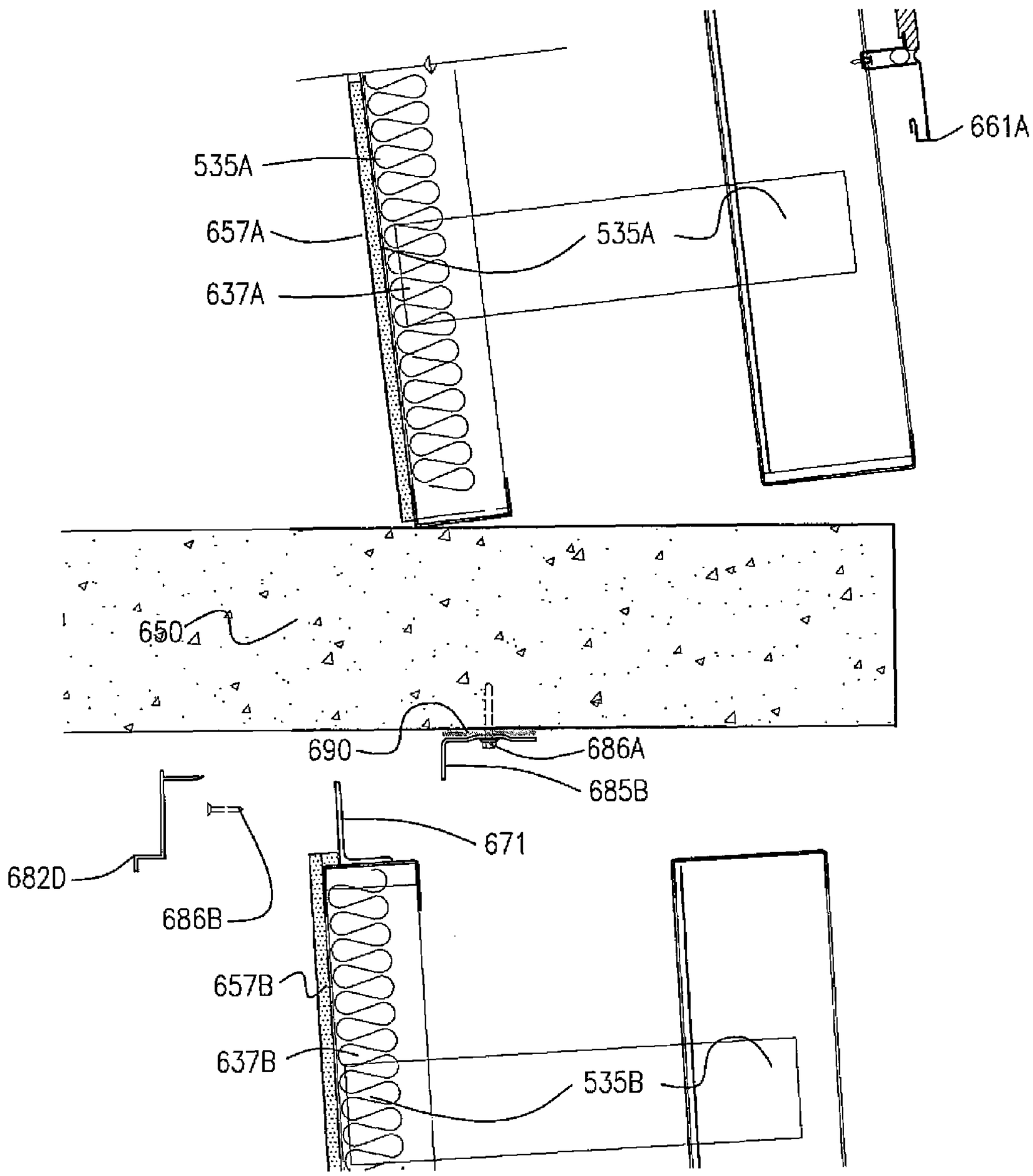

535A
657A
637A
687A
BASE
661A
621B
670
650
690
686A
685B
682D
671
686B
657B
HEAD
661C
535B
637B
535B

FIG. 29


535A
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535A
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690
686A
685B
671
682D
686B
657B
637B
535B

FIG. 30

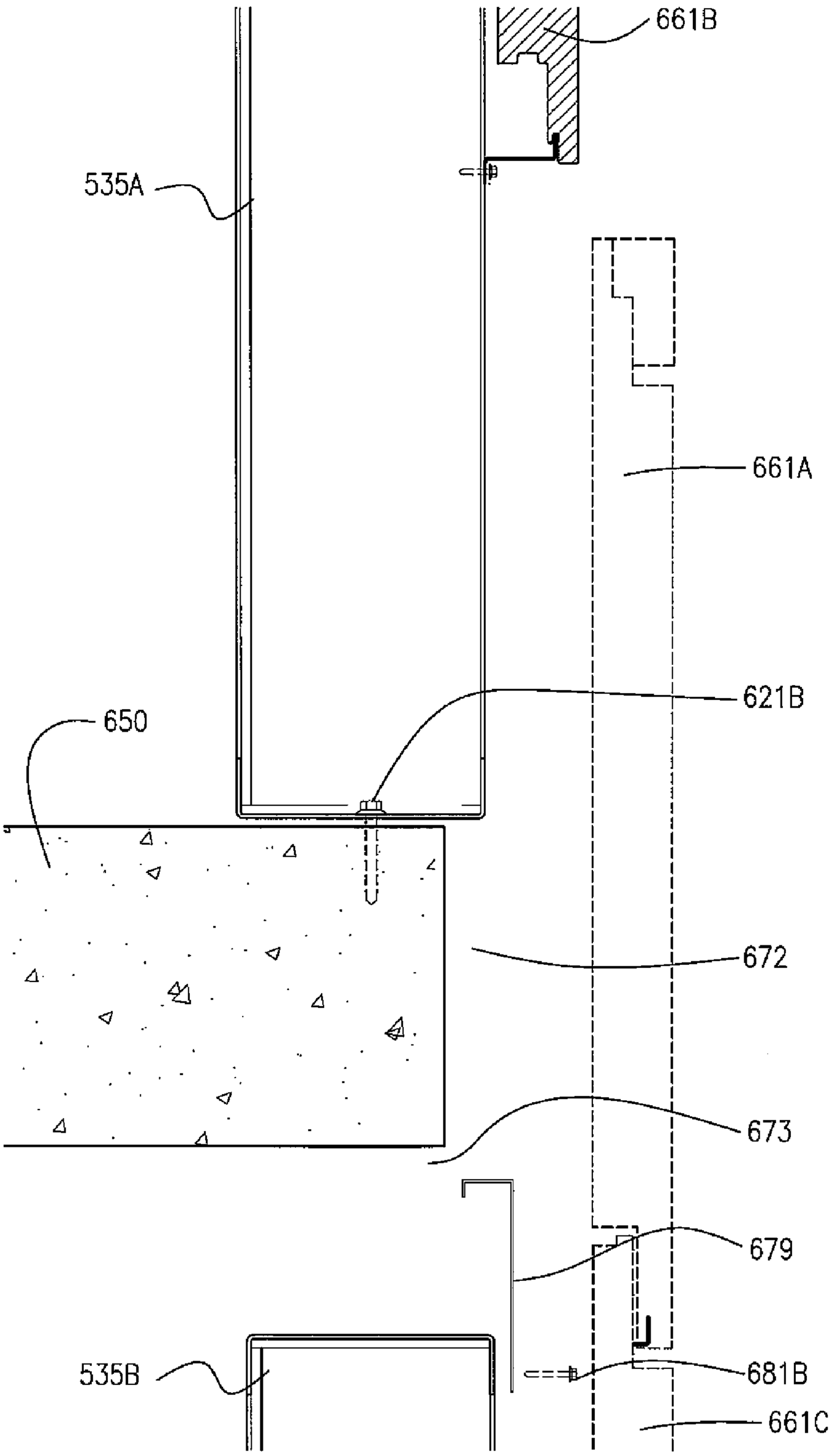


FIG. 31

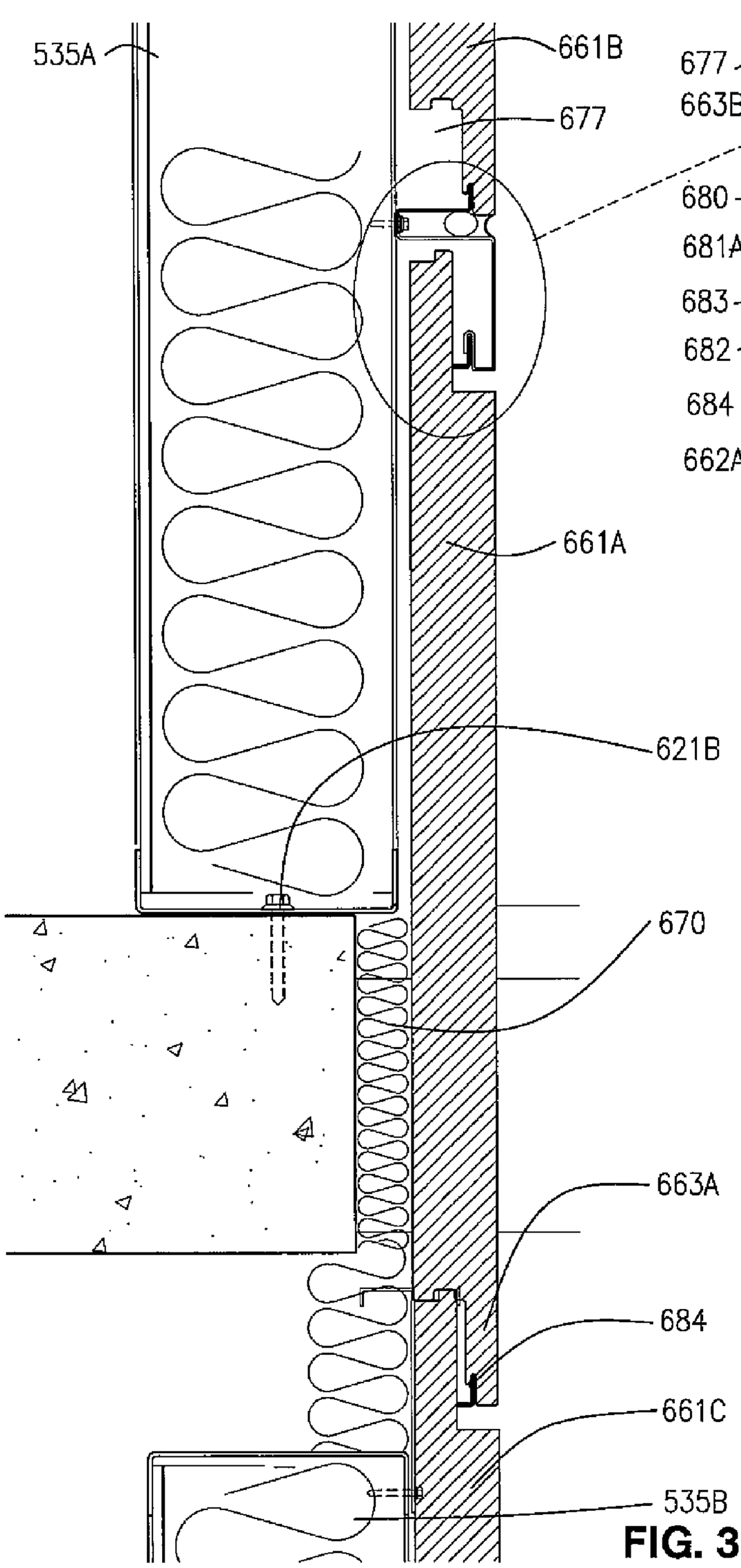


FIG. 32A

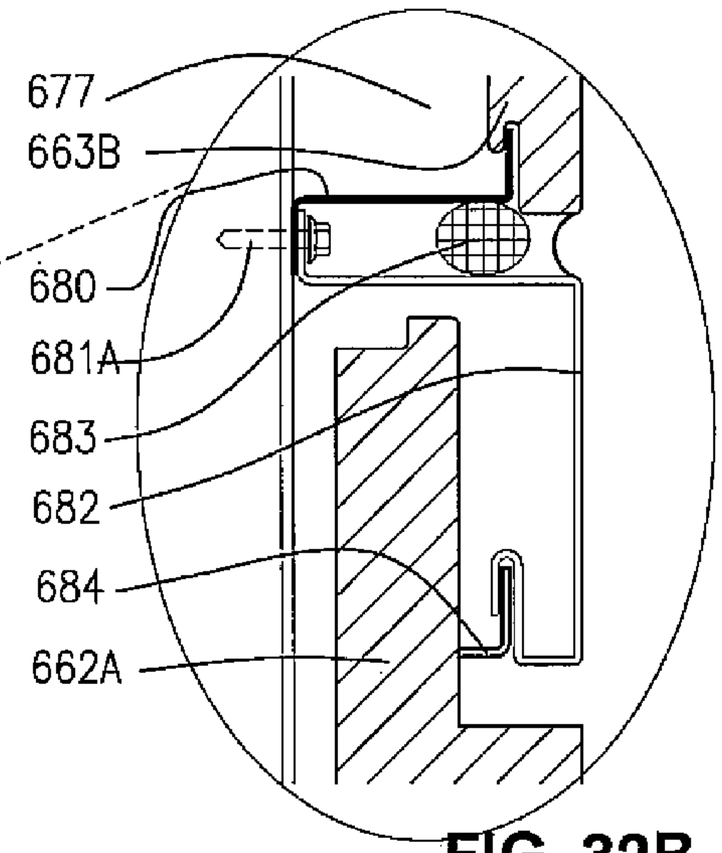


FIG. 32B

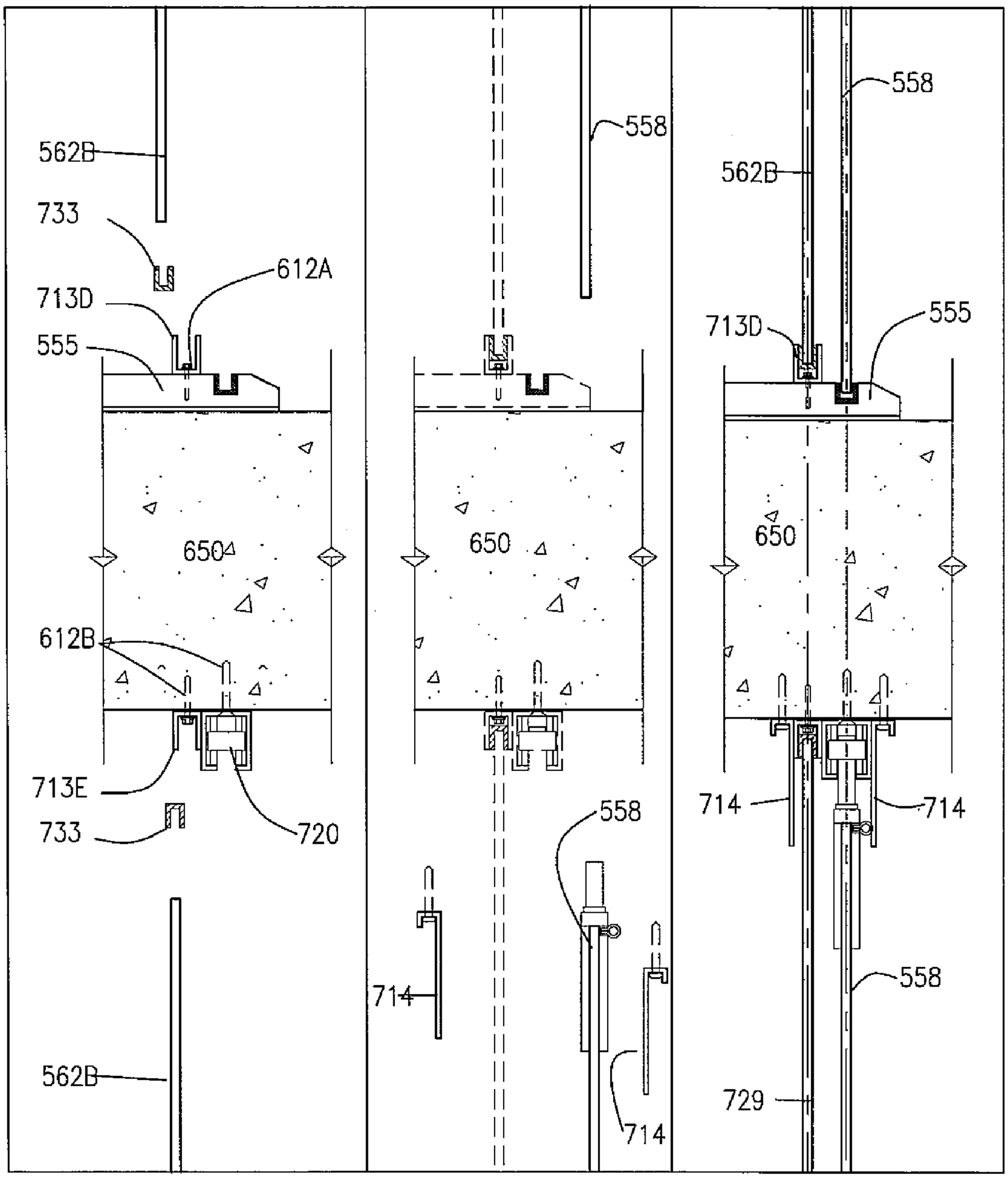


FIG. 33A FIG. 33B FIG. 33C

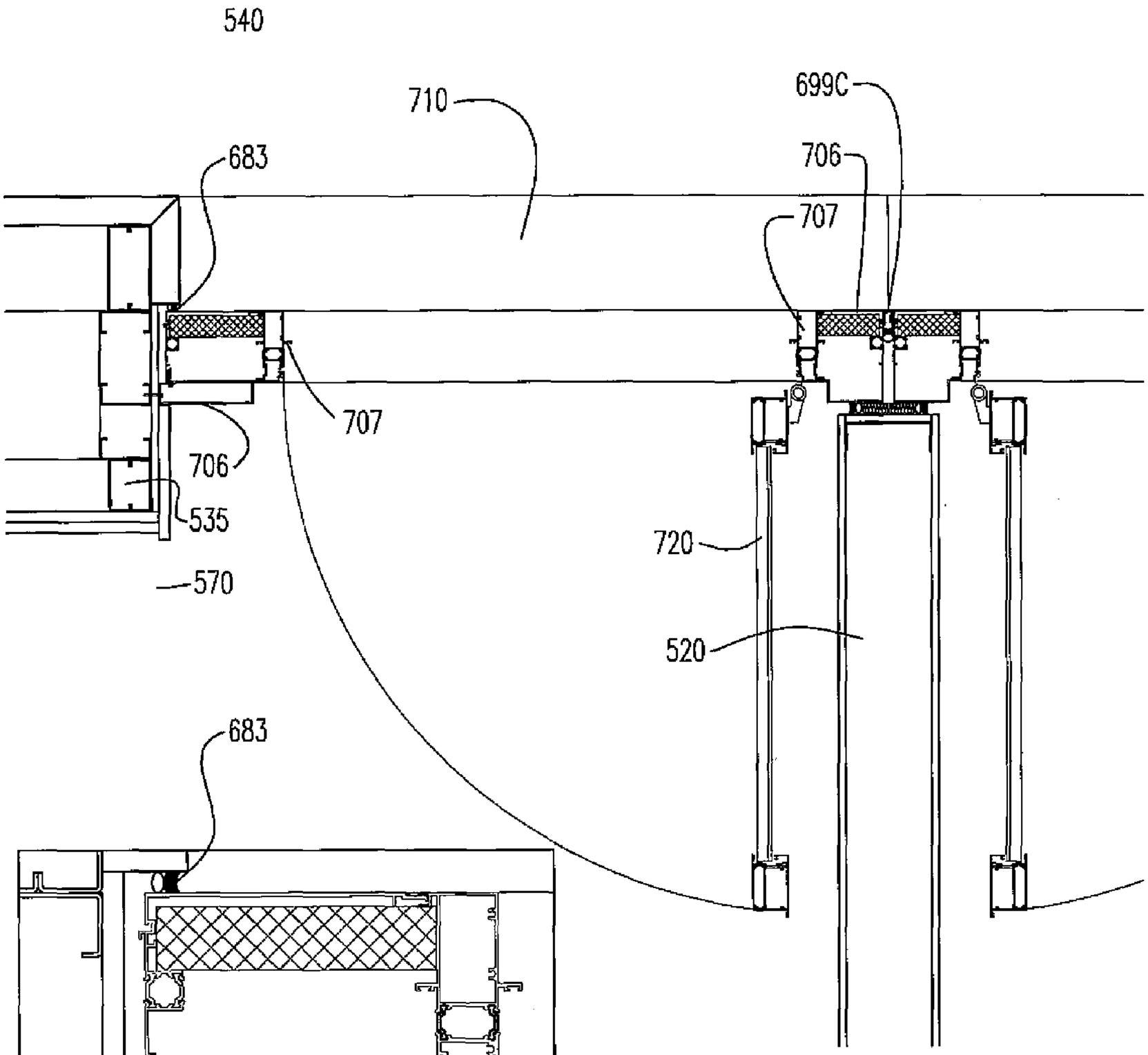


FIG. 34A

FIG. 34B

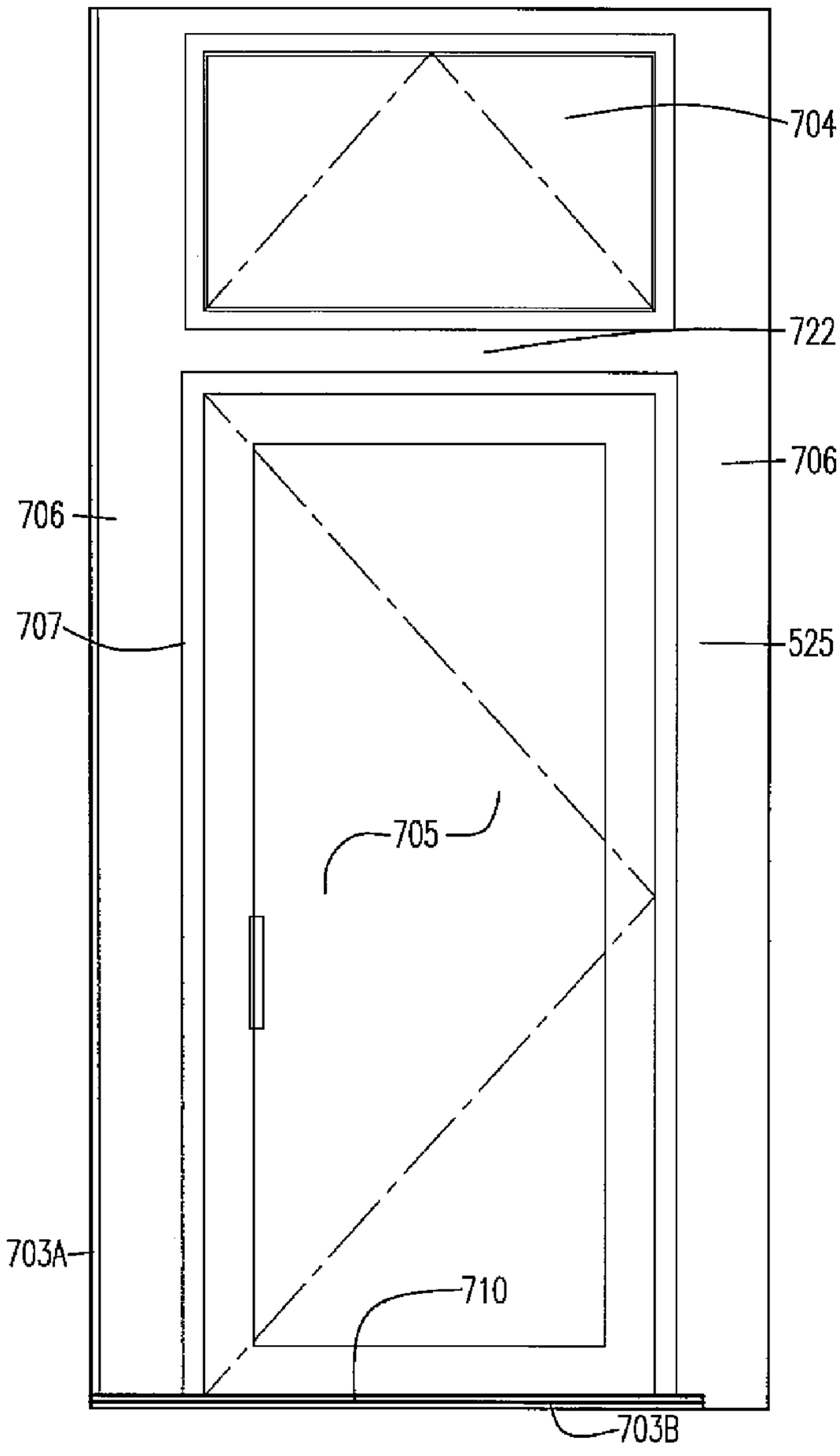


FIG. 35A

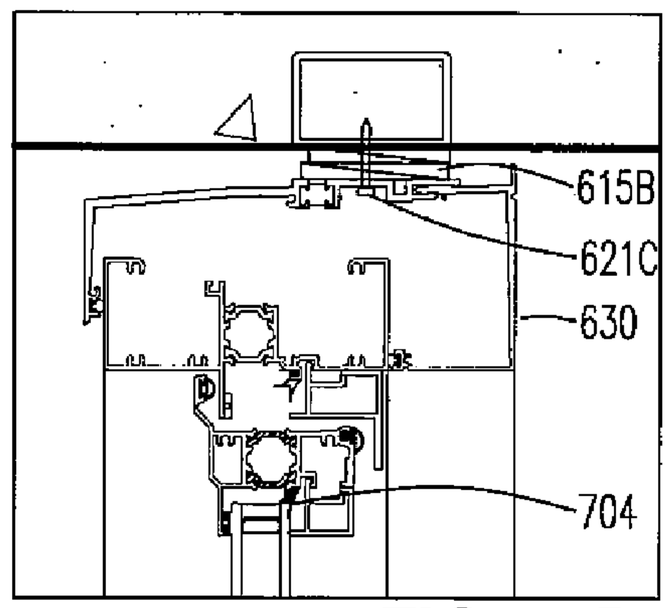


FIG. 35D

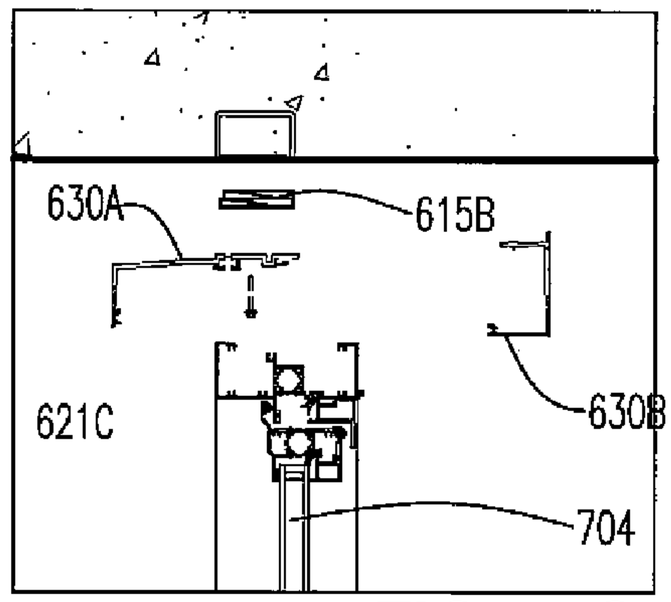


FIG. 35C

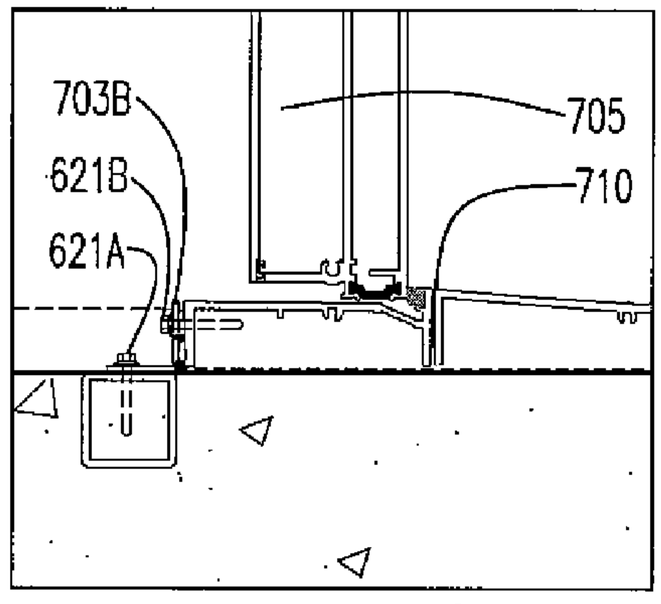
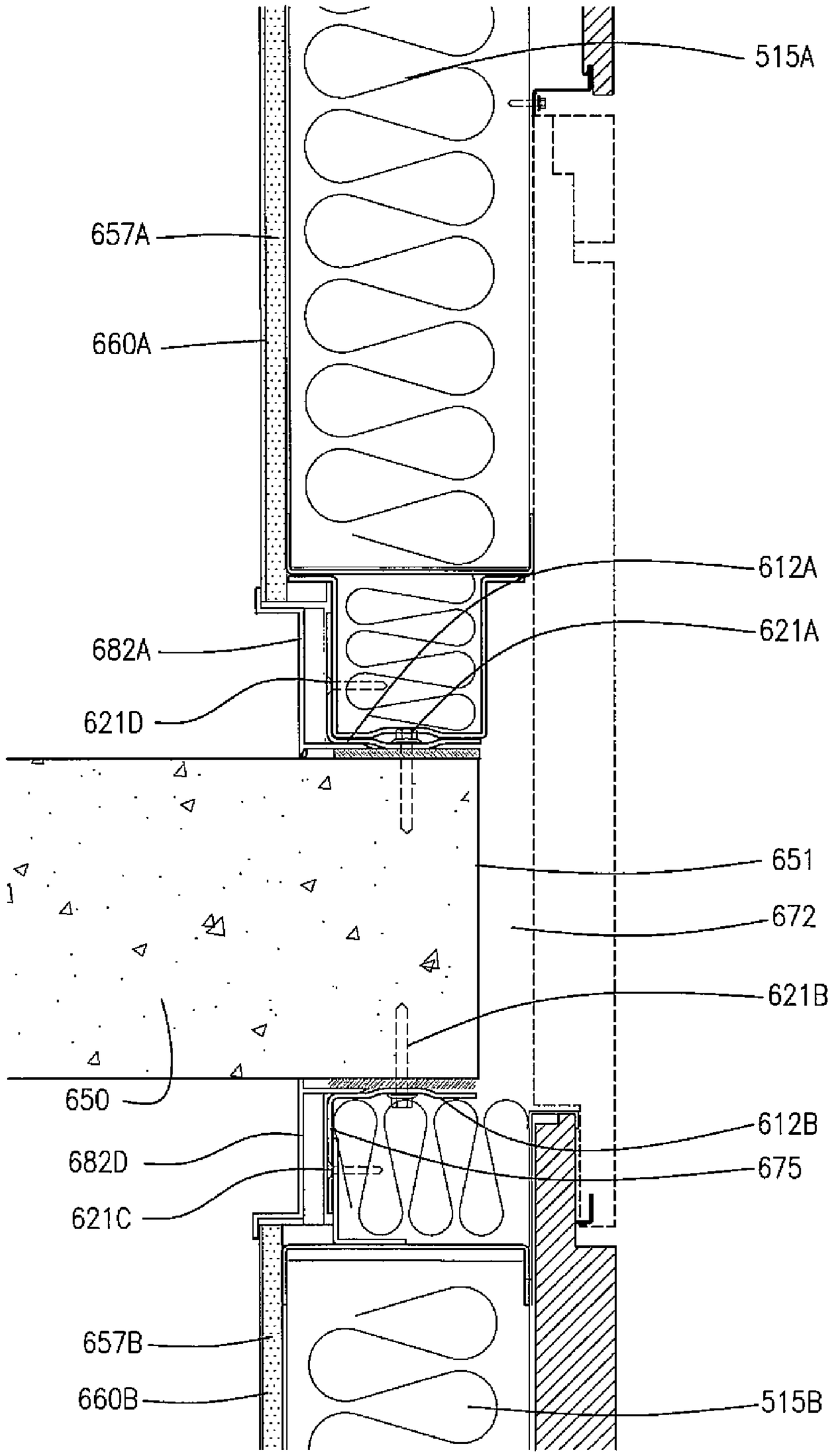


FIG. 35B


515A
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672
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650
612B
675
682D
621C
657B
660B
515B

FIG. 36

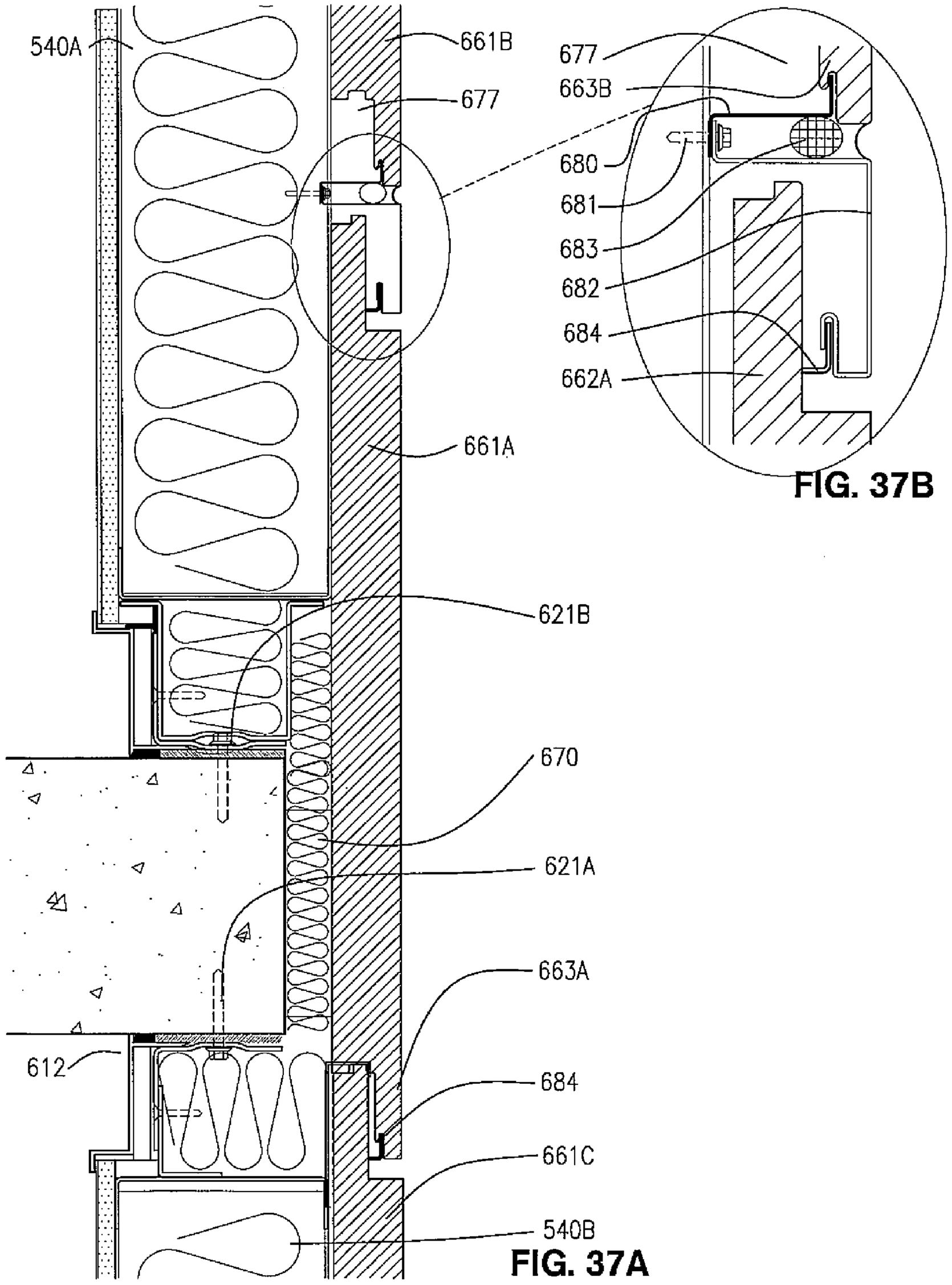


FIG. 37B

FIG. 37A

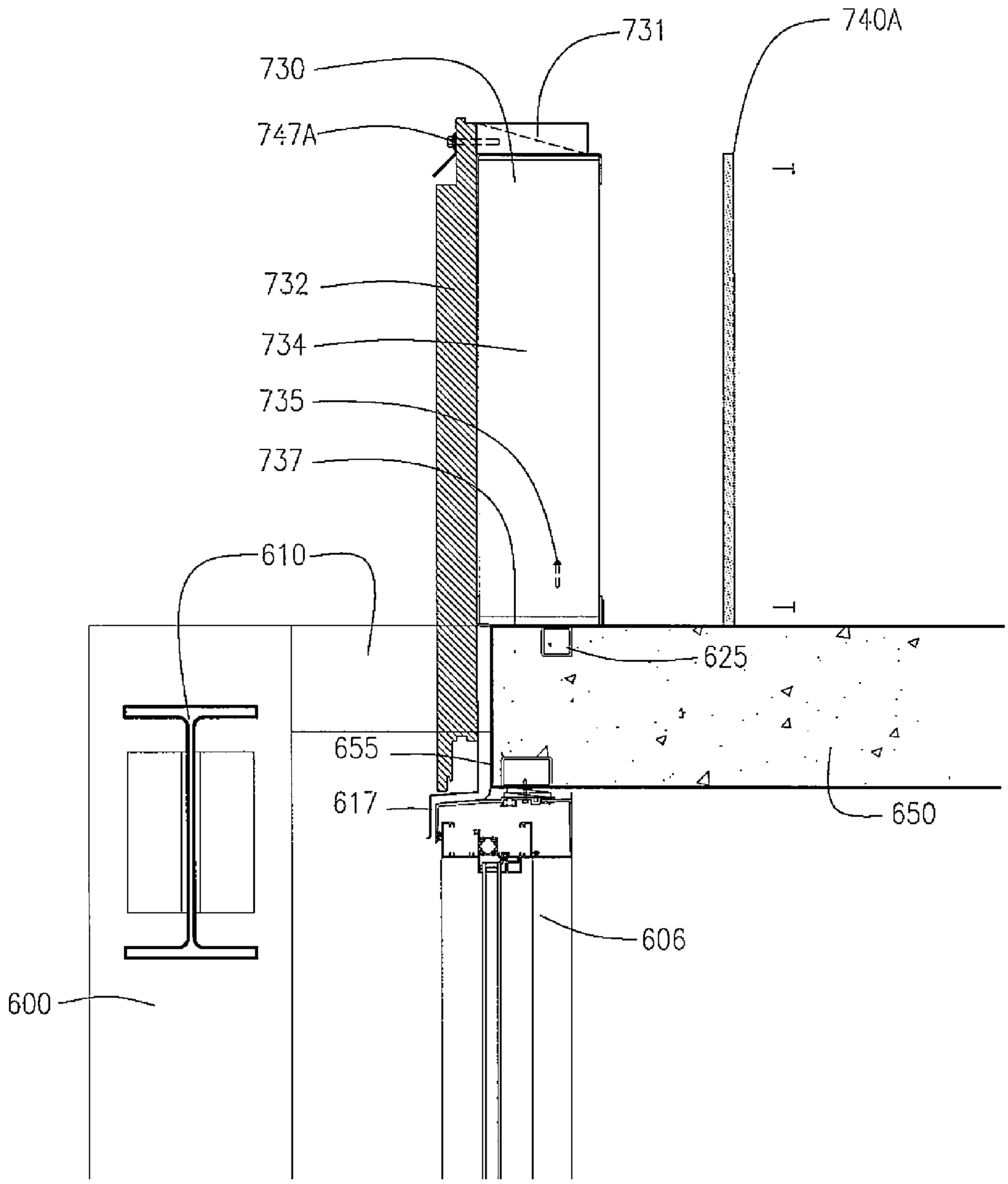


FIG. 38

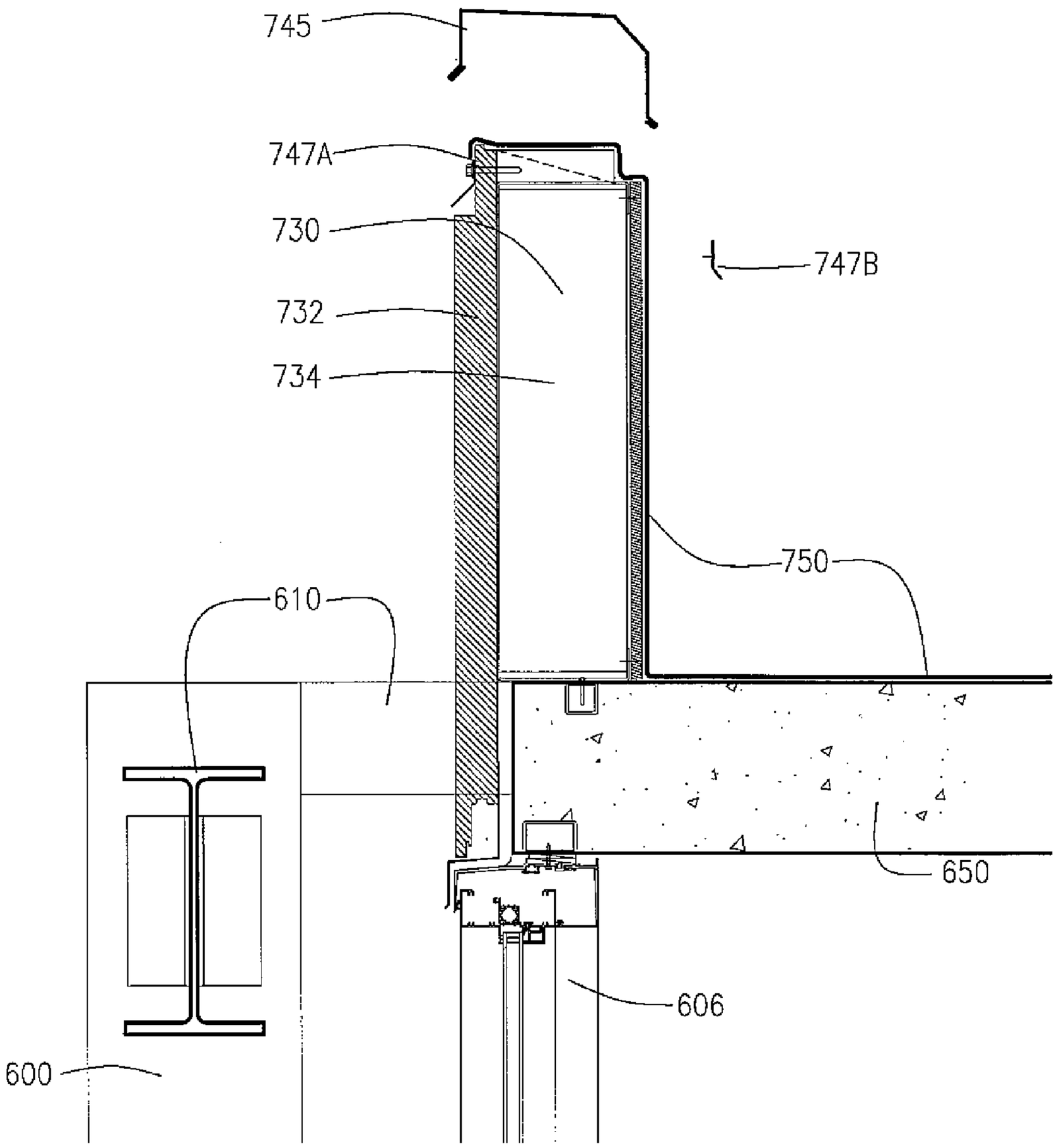


FIG. 39

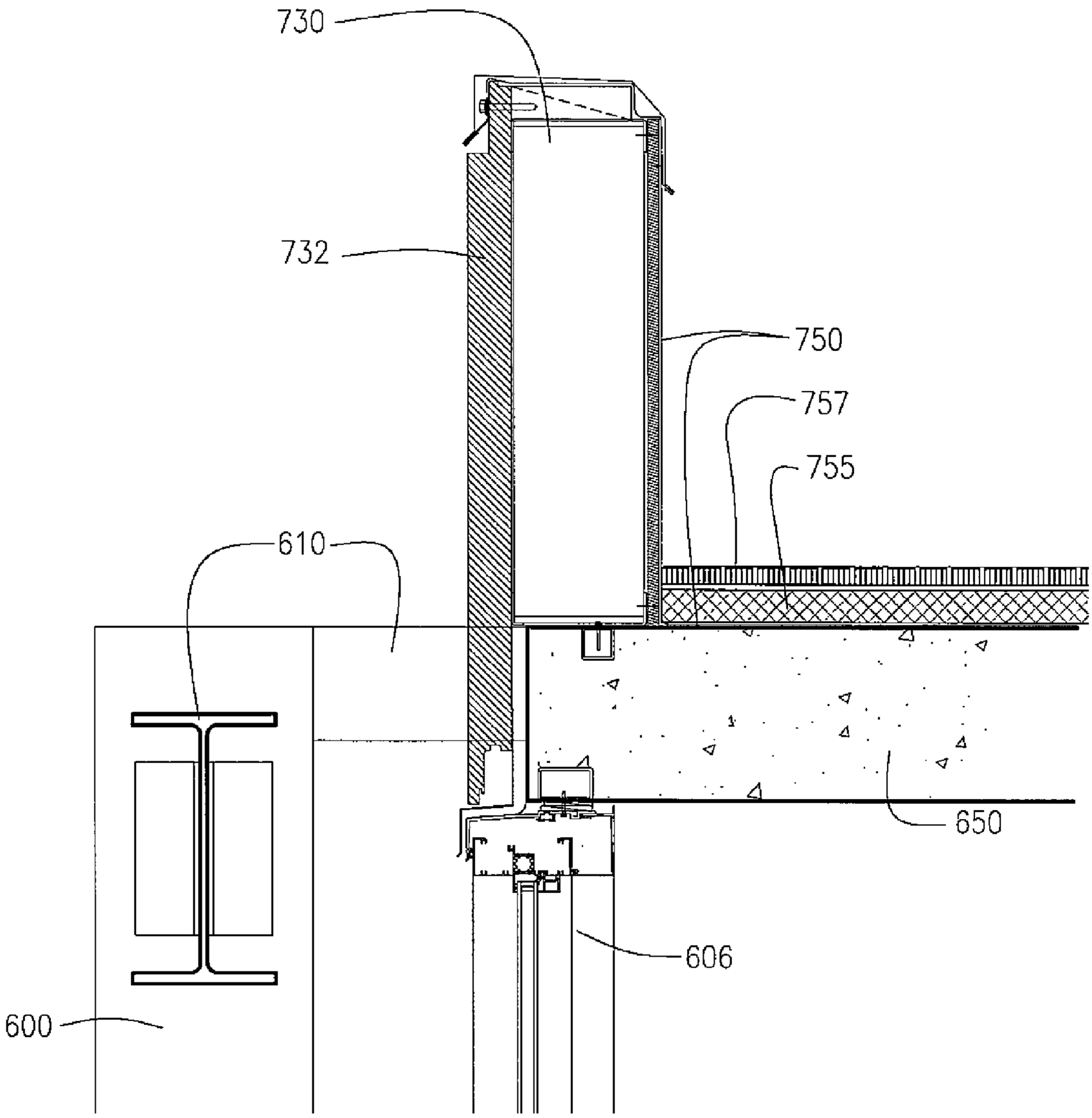


FIG. 40

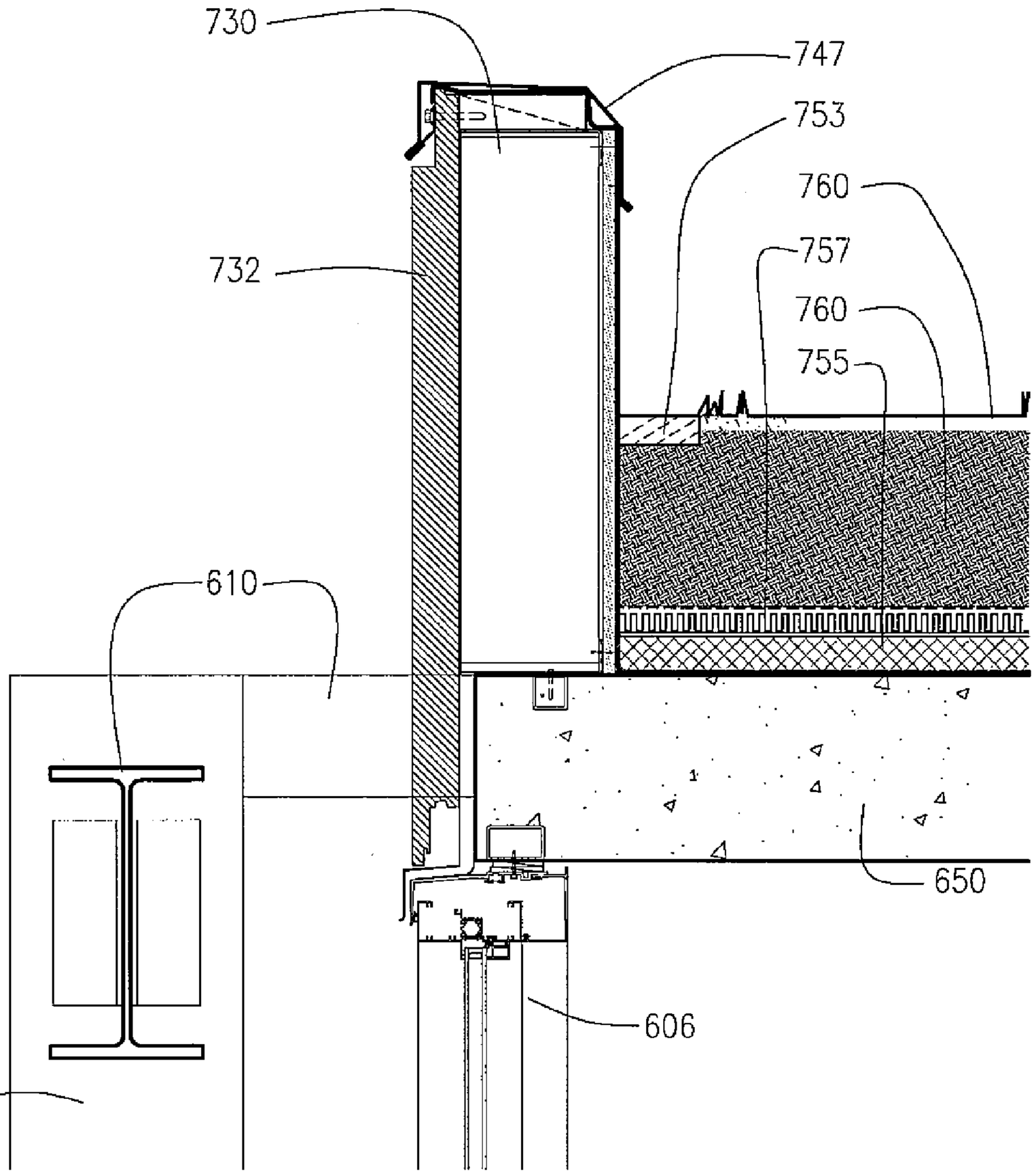


FIG. 41

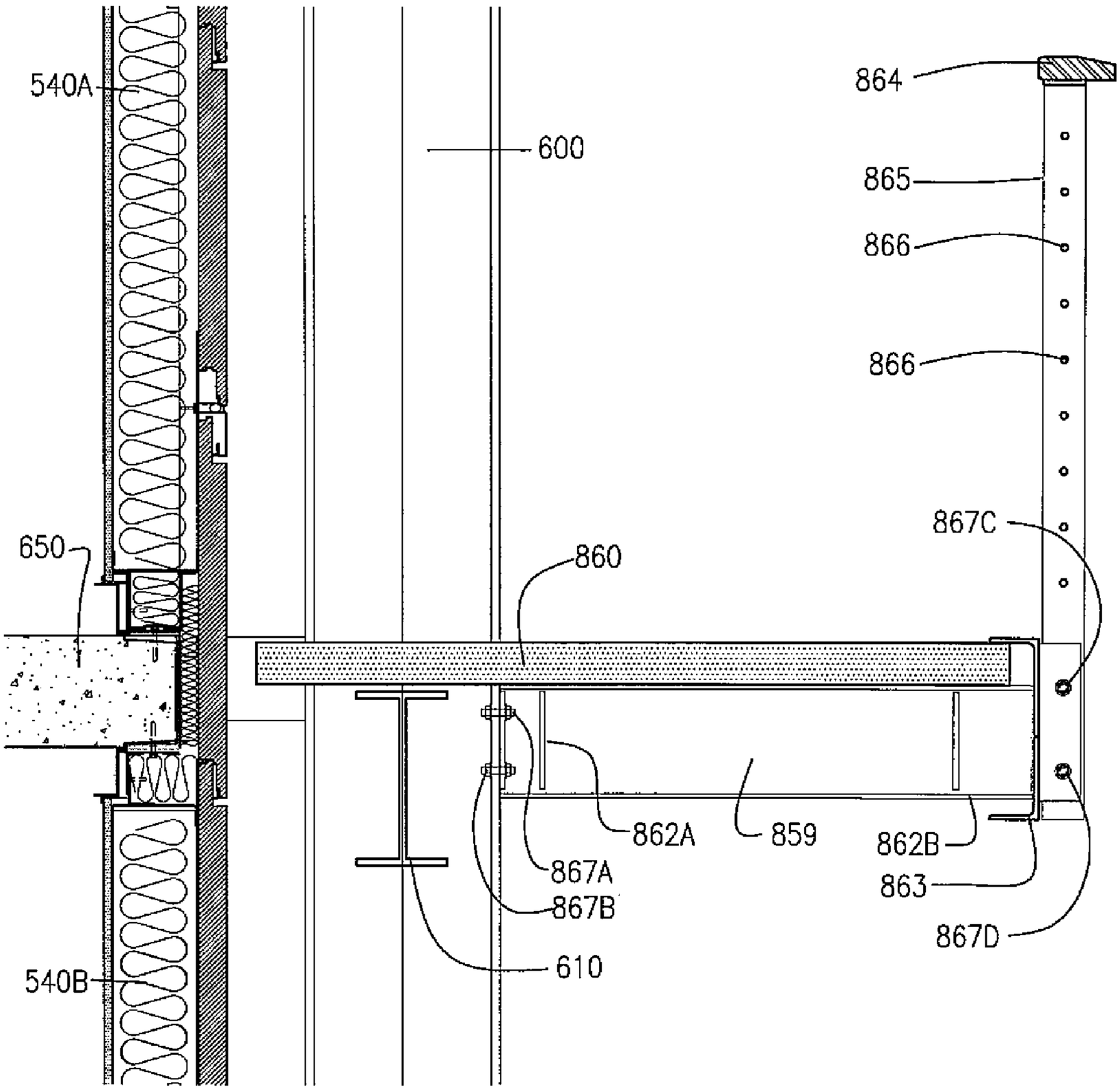

540A
600
650
860
864
865
866
866
867C
862A
859
862B
863
867A
867B
867D
610
540B

FIG. 42

PREMANUFACTURED STRUCTURES FOR CONSTRUCTING BUILDINGS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to the construction industry, and relates more specifically to a construction system and method for constructing multi-story buildings including high-rise buildings using premanufactured structures.

2. Description of Related Art

Conventional building construction methods have focused on the cost and efficiency advantages of having construction mostly manufactured at the manufacturing plants or factories. Current construction techniques that use manufactured housing structures include building modules of a certain room to be delivered to a construction site. Manufactured housing techniques offer some advantages over on-site construction methods. For example, construction for manufactured housing may be carried out year round regardless of the weather since manufacturing within a factory or plant can occur indoors. Manufactured housing methods also require less time to complete construction since assembly lines are more efficient than requiring less streamlined field work on-site.

However, it is not always cheaper to manufacture the modules at a manufacturing plant or factory to be delivered to the construction site for further integration and finishing on-site. Handling of modules can be extremely difficult, time-intensive and cost-prohibitive since there are weight and craning issues. Shipping modular structures or spaces can raise transportation issues due to weight and space problems. Due to sizes of the modules, trucks may only fit one to two modules at the most to deliver to the construction site. Lifting the modules to and from the trucks require huge cranes at the manufacturing plants as well as at the construction sites.

On-site construction is conventionally preferred for building high-rise and multi-story buildings because manufactured housing techniques are not adapted for building such building structures. Therefore, the present invention utilizes manustructures or premanufactured structures to overcome the limitations of utilizing manufactured housing structures or modules in constructing high-rise and multi-story buildings.

The advantages of the present invention is a construction system and method using as many repetitive and self-sustaining construction methods and as many preassembled and prefinished components as possible. Preassembled and prefinished components are constructed in a manufacturing facility, transported to the construction site and permanently installed within the structure in conjunction with other components to create a fully finished, comfortable and weathertight living environment.

Standardizing the components and constructing them in a manufacturing facility certainly provide the advantages of reduced materials waste, reduced energy costs and increased labor productivity. The initial assembly of the components may eventually become automated, but currently has the advantage of being carried out by less skilled labor under the supervision of highly qualified managers. Given that assembly will occur in an environmentally controlled setting, the quality of the product can be closely monitored. The potential for mold or materials damage due to exposure may be reduced by the present invention.

The present invention construction system and method results in rapid construction of multi-story buildings with institutional grade construction quality by saving time and money that takes half the time of conventional construction approaches for truly sustainable multi-story buildings.

Therefore, the present invention overcomes the disadvantages and limitations associated with multi-story modular construction and conventional construction methods to yield an energy efficient structure that can be constructed at a highly accelerated schedule at a low cost and continue to operate with very low maintenance expenses. The present invention is directed to a construction system and method for building structures of three or more stories comprised of premanufactured, preassembled, and prefinished components requiring little or no additional finishing after leaving the factory. The present invention may be used to build residential, hospital, institutional, or any multistory buildings alike for creating an energy efficient, inexpensive, and flexible building for quick assembly for multiple purposes.

BRIEF SUMMARY OF THE INVENTION

The present premanufactured structures for constructing buildings comprises a construction system for an energy efficient multi-story building with a plurality of units, the building being constructed using premanufactured structures comprising: a plurality of non-weight bearing walls, the plurality of non-weight bearing walls with finished exterior including all electrical, insulating, plumbing and communications components that are premanufactured at a site distant from a building site, the plurality of non-weight bearings walls attached to a plurality of floor and ceiling slabs and interfacing with each other to enclose the plurality of units of the building; a plurality of interior components that are premanufactured at the site distant from the building site to connect to inside portions of the non-weight bearing walls; and a plurality of exterior components that are premanufactured at the site distant from the building site to attach to exterior surfaces of the building; wherein the plurality of non-weight bearing walls, the plurality of interior components, and the plurality of exterior components are installed and connected together to provide the energy efficient multi-story building with the plurality of units with different floor plans, and optionally, a retail level with underground parking.

The premanufactured structures are used to construct multi-story buildings with a plurality of units comprising a plurality of standard single units or a plurality of mixed units, the mixed units comprising studios and one to multiple bedrooms. The multi-story buildings can also have a combination of residential and retail levels.

The plurality of non-weight bearing walls comprises: premanufactured, prefinished and preassembled exterior window walls comprising windows, insulation and weather seal; premanufactured, prefinished and preassembled end walls comprising electrical wiring, vapor barrier, insulation, studs for framing and sound barrier, and fire-rated interior and exterior surfaces; premanufactured, prefinished and preassembled exterior walls comprising electrical wiring, vapor barrier, insulation, studs for framing and sound barrier, and fire-rated interior and exterior surfaces; premanufactured, prefinished, preassembled and prewired demising walls comprising electrical wiring, insulation, studs for framing and sound barrier, and fire-rated interior and exterior surfaces; premanufactured, prefinished, preassembled, prebundled and preplumbed interior plumbing walls comprising electrical and communications connections for adjacent walls, electrical service panel, kitchen and bath wall plumbing, fans, and toilet mounting support with a water resistant, interior surface; and premanufactured, prefinished and preassembled exterior plumbing walls comprising electrical wiring, vapor

barrier, insulation, plumbing chase, studs for framing, and sound and air barrier with a water resistant and fire-rated exterior surface; wherein the non-weight bearing walls are attached to a plurality of floor and ceiling slabs at top and bottom portions of the non-weight bearing walls and interfacing with each other to enclose the plurality of units in providing the energy efficient multi-story building.

The plurality of interior components comprises: precast, preformed and prefabricated bathroom floor pans wherein preformed recess of the plurality of floor and ceiling slabs for each unit receives the bathroom floor pans; preassembled, prewired and prefinished entry doors wherein the entry doors are installed between at least two non-weight bearing walls and attached to the plurality of floor and ceiling slabs at top and bottom portions of the entry doors; premanufactured, configurable, removable and adjustable interior partitions installed on interior sides of the non-weight bearing walls of the plurality of units for separating showers, kitchens, bathrooms, bedrooms and other living areas of the each unit; and premanufactured, prefinished and preassembled kitchen and bathroom components installed on interior plumbing walls of the plurality of units; wherein the bathroom floor pans are installed into the preformed recess before installation of the interior plumbing walls and exterior plumbing walls; and wherein the entry doors, the interior partitions, the kitchen and bathroom components are installed after installation of the interior and exterior plumbing walls but before installation of the plurality of exterior components.

The kitchen and bathroom components comprise: premanufactured, prefinished and preassembled kitchen unit with cabinets, countertops, preinstalled plumbing, plumbing connections, electrical wiring, vent ducting, and exhaust fans and light fixtures; premanufactured, prefinished and preassembled bathroom vanity with at least one sink and preinstalled plumbing; and premanufactured and preassembled cabinets with integral exhaust fans and light fixtures; wherein the premanufactured, prefinished and preassembled kitchen units, the bathroom vanities and the cabinets are installed on inner sides of the interior plumbing walls after installation of the interior and exterior plumbing walls, the entry doors, and the interior partitions but before installation of the plurality of exterior components.

The plurality of exterior components comprises roof components and prefabricated, prebundled exterior walkways with preassembled sections to support railing and decking for rapid installation. The roof components are comprised of premanufactured, prefinished and preassembled parapet walls comprising studs for framing, fire-rated exterior surface with corrugated siding, and integral flashing to prevent water penetration, the roof components are installed on roof slabs on top of the building after installation of the plurality of interior components but before assembly of the exterior walkways.

The present invention further utilizes recycled products and materials and incorporates alternative energy sources and methods of environmental control. Water collection and retention, and use of solar panels for heat and power are also incorporated in the manner best-suited for the local conditions and energy efficiency.

The foregoing and other objectives, features, and advantages of the invention will be more readily understood upon consideration of the following detailed description of the invention, taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S)

The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate various exemplary embodiments.

FIG. **1** illustrates a multi-story building according to an embodiment of the present invention.

FIG. **2** illustrates a building plan with various floor plans of the building of FIG.

FIG. **3** illustrates a side elevation view of the multi-story building of FIG. **1**.

FIG. **4** illustrates a side sectional view of an exemplary portion of the multi-story building of FIG. **1**.

FIG. **5** illustrates a floor plan of an exemplary portion of the various floor plans of FIG. **2**.

FIG. **6** illustrates various embodiments of a single unit for the building of FIG. **1**.

FIG. **7** illustrates the structural framing of the multi-story building of FIG. **1**.

FIG. **8** illustrates the structural framing for the floor and ceiling assembly before the floor and ceiling slabs are assembled into place.

FIG. **9** illustrates the structural framing for the floor and ceiling assembly after the floor and ceiling slabs are assembled into place.

FIGS. **10**A-B illustrate a components plan of an exemplary studio unit for various walls and components before and after assembly.

FIGS. **11**A-B illustrate a components plan of two different exemplary two-bedroom units for various walls and components before and after assembly.

FIGS. **12**A-F illustrate a perspective view of different phases of assembling an exemplary studio unit.

FIGS. **13**A-F illustrate a perspective view of different phases of assembling a two-bedroom unit.

FIGS. **14**A-G illustrate side and top views of the exterior window wall assemblies for various units.

FIGS. **15-16** illustrate sectional details of structural members for attaching exterior window walls to the structural frame and slab.

FIG. **17-18** illustrate cross-sectional details of interior partitions and bedroom doors before and after attaching to the floor and ceiling slab.

FIG. **19** illustrates cross-sectional details of demising walls attached to the floor and ceiling slab.

FIGS. **20**A-C illustrate sectional details of structural members at a head portion before attaching the demising wall to the floor and ceiling slab.

FIG. **21** illustrates cross-sectional details of a demising wall before attaching to the floor and ceiling slab.

FIGS. **22**A-C illustrate sectional details of steps to secure the demising walls to the floor and ceiling slab.

FIG. **23** illustrates cross-sectional details of additional steps to secure the demising walls to the floor and ceiling slab.

FIG. **24** illustrates cross-sectional details of additional steps to secure the demising walls to the floor and ceiling slab.

FIG. **25**A-B illustrate cross-sectional details of a demising wall interfacing with an exterior window wall and entry door assembly after attaching the exterior wall to the floor and ceiling slab.

FIGS. **26**A-B illustrate top and side views of a bathroom floor pan securely attached to a recessed floor and ceiling slab.

FIG. **27** illustrates cross-sectional details of a utility wall above and beneath the floor and ceiling slab for interior plumbing assembly.

FIG. **28** illustrates a side view of the utility wall without bath and kitchen components in place as well as the utility wall with bath and kitchen components in place.

FIG. **29** illustrates cross-sectional details of utility walls attached to the floor and ceiling slab.

FIG. **30** illustrates cross-sectional details of utility walls before attaching to the floor and ceiling slabs.

FIG. **31** illustrates cross-sectional details of a utility wall before attaching to the exterior sides of units.

FIG. **32** illustrates cross-sectional details of a utility wall after attaching to the exterior sides of units.

FIGS. **33**A-C illustrate cross-sectional details of interior partitions, entry doors and assembly of bathroom components.

FIG. **34** illustrates a top view of an entry way with utility walls and demising walls installed.

FIGS. **35**A-D illustrate a side view of an entry way and attachment to the walls and floor slab.

FIG. **36** illustrates cross-sectional details of end walls before attaching to the exterior wall panels.

FIGS. **37**A-B illustrate cross-sectional details of end walls of FIG. **36** after attaching to the floor and ceiling slabs and exterior wall panels.

FIGS. **38-39** illustrates cross-sectional details of installing a parapet wall component over a roof.

FIG. **40** illustrates cross-sectional details of installing a garden roof drain next to the parapet wall component.

FIG. **41** illustrates cross-sectional details of a complete garden roof assembly.

FIG. **42** illustrates cross-sectional details of constructing exterior common walkways.

DETAILED DESCRIPTION OF THE INVENTION

Before describing the invention and the figures, some of the terminology should be clarified. Please note that the terms and phrases may have additional definitions and/or examples throughout the specification. Where otherwise not specifically defined, words, phrases, and acronyms are given their ordinary meaning in the art. Exemplary embodiments may be better understood with reference to the drawings, but these embodiments are not intended to be of a limiting nature.

As used herein, "exterior window wall" refers to a pre-fabricated and pre-bundled wall unit with pre-assembled sections with insulated aluminum and glass exterior, unitized window wall system. The exterior window wall is an aluminum and glass panel with an operable window unit. The exterior window wall may include an integral sliding door and railing to create an open wall with a flush 'Juliet' balcony. A first type of exterior window wall is used in a straight configuration. A second type of exterior window wall is used in corner units located adjacently to a building's corners. A third type of exterior window wall, also referred to as "the exterior wall panel" that is a pre-fabricated and pre-bundled wall unit with pre-assembled sections with insulated aluminum and glass exterior, unitized window wall system and a fixed opaque window assembly positioned directly adjacent to unit doors at the ends of a building. All of the exterior window walls are fully weather-sealed and able to provide at least an R-value of 20. An R-value refers to a measure of thermal resistance that is typically used in the building industry.

As used herein, "exterior wall" refers to a pre-fabricated, pre-bundled, and non-utility wall unit with pre-assembled sections that includes electrical wiring, vapor barrier and thermal insulation with a finished interior surface. The exterior wall may include plumbing for sprinklers.

As used herein, "end wall" refers to a pre-fabricated, pre-bundled, and non-plumbing wall unit with pre-assembled sections that includes electrical wiring, vapor barrier and thermal insulation with a finished interior surface. The end wall is very similar to the exterior wall except that the end wall has a significantly different configuration, typically used as the end wall for a building. The end wall may include plumbing for sprinklers.

As used herein, "demising wall" refers to a pre-fabricated, pre-bundled, and pre-finished wall unit with pre-assembled sections that includes electrical wiring and may include electrical radiant heat with an approximate length of 20 feet. The demising wall may include plumbing for sprinklers.

As used herein, "utility wall" refers to a pre-fabricated and pre-bundled wall with pre-assembled sections that includes kitchen and bath wall plumbing, a unit's electrical service panel, exhaust vents/fans, and any associated electrical and communications distribution wiring for the adjacent walls. The utility wall's plumbing includes the kitchen and bath supply, waste lines and vent piping. The utility wall has a finished interior surface and contains pre-installed exhaust vents/fans and vent trims. The utility wall further includes thermal insulation, and encapsulates a unit's plumbing chase. The utility wall has a finished exterior surface, and may include fire-rated wall board and insulation to act as integral air and vapor barrier.

As used herein, "parapet wall" refers to a pre-manufactured, pre-finished, and pre-assembled wall with approximately 16 to 18 feet at the top portion of the exterior wall that connects to a roof slab and accommodates a building's roofing and garden roof conditions.

As used herein, "entry door," refers to a pre-fabricated, pre-bundled entry door unit with operable re-light panel, inner and outer frames, and all associated door hardware with pre-assembled sections that includes electrical wiring and may include plumbing for sprinklers as rapid installation and to be set in place at the final exterior wall or next to the utility walls. A threshold is provided for installation after the entry door is in place.

As used herein, "exterior walkway" refers to a pre-fabricated, pre-bundled walkway with pre-assembled sections that supports railing and decking for rapid installation.

As used herein, "bathroom floor pan" refers to a single pre-cast and pre-fabricated unit with a sloped shower floor and integral drain that is set in place. The bathroom floor pan is constructed for easy delivery and rapid installation.

As used herein, "kitchen unit" refers to a pre-fabricated and pre-assembled kitchen unit that includes cabinets, preinstalled plumbing, plumbing connections, electrical wiring, vent ducting, countertops, at least one sink, exhaust vents/fans and light fixtures to be installed in the kitchen on the utility walls.

As used herein, "bathroom vanity" refers to at least one sink and preinstalled plumbing to be installed in the bathroom on the utility walls.

As used herein, "cabinets" refers to premanufactured and preassembled cabinets with integral exhaust fans and light fixtures to be installed in the kitchen and bathroom on the utility walls.

Referring now in detail to the drawing figures, FIG. **1** illustrates an exemplary embodiment of a building **100** built according to the construction system and method as described in the present invention. FIG. **1** illustrates an exemplary five-story building **100** that is part of a development including several residential buildings **101**, **102**, **103** with a plaza or retail floor **110** at street level for commercial activity and secure, below-grade parking underneath the building **100**. All

of the residential buildings **101**, **102**, **103** in this development are to be constructed using the same construction system and method of the present invention.

FIG. **2** illustrates a building plan **200** with four variations of floor plans **200**A-D of the exemplary building **100** of FIG. **1**. As shown in FIG. **2**, all of the buildings share common exterior walkways. FIG. **3** illustrates a side elevation view of an exemplary six-story building. This exemplary building comprises first through fifth levels of residential units **210**, **220**, **230**, **240**, **250** above a main, retail floor **110** for commercial development at the street level and a level of below-grade parking (shown in FIG. **4**). FIG. **4** illustrates another side sectional view of an exemplary portion of the multi-story building of FIG. **1** with an approximate height of sixty-five feet. As shown in FIGS. **3** and **4**, the main, retail floor **110** for commercial activity is shown with residential levels **210**, **220**, **230**, **240**, **250** above the retail floor **110**. Every residential level from first through fifth levels **210**, **220**, **230**, **240**, **250** is identical in building floor plan and configuration. However, the present invention is not limited to identical building floor plan and configuration for every floor and allows the number bedrooms in any given residential unit and the layout of the units on any given floor to be modified by simple relocation of a demising wall. These modifications to the layout of the units or number of bedrooms also do not require changing out of the window wall components. However, depending on the specific circumstances, there may be additional modifications to the exterior walls to accommodate different floor plans and layout of the units for various floor levels. A parking level **10** at below-grade **50** is shown for parking cars for commercial and residential use.

FIG. **5** illustrates a floor plan **200**A from FIG. **2** of the building plan **200**. The floor plan **200**E of the building plan **200** illustrates four, different layout types of units **200**E-**1** to **200**E-**7**. FIG. **6** illustrates exemplary floor plans **300**A-J of the different types of units and layout variations to be implemented into any floor level **210**, **220**, **230**, **240**, **250** of a multi-story building **100**. An efficiency floor plan **300**A is illustrated in the first exemplary unit type. A studio floor plan **300**B is illustrated in the second exemplary unit type. A one-bedroom plan **300**C, as possible corner units, is illustrated in the third exemplary unit type. A two-bedroom efficiency floor plan **300**D, as possible units, is illustrated in the fourth exemplary unit type. A two-bedroom plan **300**E, as possible end units, is illustrated in the fifth exemplary unit type. In **300**F, a two-bedroom with two bathrooms is illustrated in the sixth exemplary unit type. A three-bedroom with three beds **300**G, as possible end units, is illustrated in the seventh exemplary unit type. A two-bedroom with two bathroom floor plan **300**H on a corner is illustrated in the eighth exemplary unit type. A three-bedroom with two bathroom floor plan **300**J on a corner is illustrated in the ninth exemplary unit type.

The construction of the multi-story building **100** is described in detail for the load bearing assembly of the structural frame **400**, and floor and ceiling slabs **450**. More specifically, FIG. **7** illustrates the structural frame **400** of the exemplary multi-story building **100** of FIG. **1**. The structural frame **400** material of the present invention is preferably steel even though other materials with similar strength and durability may be used for constructing the building **100**. The structural frame **400** can also be made out of concrete or concrete masonry unit. Therefore, utilizing steel or concrete for the structural frame **400** is not meant to be limiting. Vertical columns **405** and lateral bracing are used for this load bearing assembly of the structural frame **400**. Structural steel framing occurs only at the perimeter of the building's slabs. All primary steel framing members are positioned exterior to the building for providing support. Any number of structural framing can be delivered only to be limited in size by shipping or trucking restrictions. The steel framing **400** is delivered to the site in as-complete-of-an-assembly as possible. Vertical columns **405** are commonly hoisted by crane and bolted and braced into place. The steel frame **400** only occurs above the terrace level **210**. All of the perimeter steel framing **400** for the building **100** is placed prior to pouring any of the building's slabs **450** (as shown in FIGS. **8-9**) above the terrace level **210**. The horizontal support columns **410**A-E are used to hoist and support the building's slabs **450** at their finished elevations which will be described in more detail in FIGS. **8-9**.

For preconstruction and excavation prior to building the structural frame **400**, conventional methods of surveying, excavation and shoring may be utilized that are appropriate for the existing soil/ground conditions and preferred depth required for excavation. For example, deeper excavation requires shoring and possible below-grade waterproofing. Shoring may be constructed using concrete or wood depending on the best option for the area. Locating, trenching and extending the existing utilities to the new structure utilize conventional methods of construction and occur in conjunction with excavation and construction of the foundation.

For foundation construction, including basements, if applicable, footing is first applied and spread and matted evenly. Any forming, reinforcing, and casting of footings and foundation walls utilize conventional methods of concrete construction. For basements formwork and reinforcing of below-grade walls may utilize conventional slip-form concrete construction. Slip-form construction refers to a method by which large towers or bridges are built from concrete by pouring concrete into a form and moving the hardened concrete. Typically, slip-form construction minimizes the materials used in formwork and labor, and reduces the amount of concrete waste produced. Slip-form construction also allows for the foundation walls to be erected with the rapid speed with minimal amount of concrete waste. Unlike other concrete methods, slip-form construction does not produce overshot concrete structures and requires very little clean-up or hauling away of waste concrete product. All site utilities will be extended to the building's service points while staged and protected for future connections. Similarly for elevator and stair foundation, excavation and forming of the foundation for the elevator and stair systems are carried out in conjunction with the rest of the building's excavation and forming. Formwork is properly placed, reinforcement added, and the foundation concrete may be placed and finished.

For concrete slab on grade construction, conventional construction practices are utilized. A slab-at-grade may occur either at the basement level or at grade level if no basement is built. Utilities are extended so that they are 6 to 8 feet above the top of the slab either at the basement level or at grade level. Once this step is finished, the steps of placing the backfill, providing compaction, installing gravel, positioning vapor barrier if required for local geotechnical review and securing the slab reinforcement to be followed by placing and finishing the concrete slab. If a particular design incorporates below-grade parking, the step of constructing a ramp is to be implemented. Alternatively, the step of constructing a ramp can occur after the slab-on-grade is positioned into place. Typically, the ramp's formwork is placed and followed by the step of securing and installing of the slab reinforcement. After these steps, the ramp's concrete slab may be placed and finished.

Assuming that only one level of parking is constructed below-grade, the steps of positioning the shoring and forming the slab at-grade level are carried out after the basement slab and ramp are placed. Afterwards, the steps of securing slab reinforcement, any block-outs, or sleeves required for the building's mechanical, plumbing, electrical, communications, site planter drainage, irrigation, parking control systems and electrical connections for security and lighting are implemented. The steps of pouring, finishing and sealing concrete are then implemented. If commercial or retail level is being considered for the at-grade level, then the concrete slab at the second story is placed by conventional shoring and forming methods.

For constructing a plaza **110** for retail at the street level with an exterior courtyard, a residential terrace may be constructed at the level immediately above the retail level as shown in FIGS. **1**, **3-4**. Conventional methods for cast-in-place concrete construction are used for all construction up to, and including the terrace level slab. Cast-in-place concrete construction has been in use for foundations, slabs-on-ground, structural support such as walls, beams, columns, floors, roofs, large portions of bridges, pavements, and other infrastructures by transporting concrete in its unhardened state to the site for placement in forms. Similar to previous conventional methods, the step of placing slab reinforcement, any block-outs or sleeves required for the building's mechanical, plumbing, electrical and communications systems as well as any walkway drains, and electrical connections for security and lighting are implemented. Once reinforcement and block-outs are placed, concrete can be placed, finished and sealed. All columns for the plaza at the street/retail level **110** utilize cast-in-place concrete construction. The reinforcement for the columns is placed first. Thereafter, the column formwork is placed before pouring the concrete for forming the columns. These steps are carried out prior to erecting any shoring for the terrace slab **205**. Shoring is then placed to support any decking made of wood or other similar materials and other formwork for the terrace slab **205** at the second story level above the plaza/retail level **110**. This step is followed by the step of placing the slab reinforcement, any block-outs or sleeves required for the building's mechanical, plumbing, electrical and communications systems as well as for any courtyard drains, irrigation supply lines and electrical connections for security and lighting. Once the reinforcement and block-outs are placed, the terrace slab of concrete **205** is placed, finished and sealed.

The next sequence of steps involves installation of elevators and stairs. The pre-fabricated, pre-bundled stairs with pre-assembled sections is delivered to the site. Lower sections of the stairs are set and anchored into place simultaneously with the placement of the street level slab or at-grade slab **430**. The logical installation of the stairs will track closely with the installation of the building's vertical columns **405**. Installation of the structural framing for the elevator enclosure will track in conjunction with installation of the rest of the building's vertical columns **405**.

FIGS. **8-9** illustrate the steps of forming the floor and ceiling slabs **450** and placing the floor and ceiling slabs **450** at each level by lifting up the slabs **450**A-E and securing the slabs **450**A-E at its appropriate elevation level. The floor and ceiling slabs **450** above the plaza/retail level **110** utilize a method of construction wherein the slab formwork is reused. Determining whether the slabs are poured one-on-top-of-the-other and hoisted to their appropriate elevation, or the roof slab is placed first and then the formwork is lowered after the placement of each slab, depends on a general contractor's decision based on the local conditions and logistics of each site. The preferred method is pouring the slabs **450** one-on-top-of-the-other which are then hoisted to their appropriate elevation level. In the preferred method, a bond braking solution is applied to the surface of the lower slab between each pour of the slab to ensure adequate separation between the slabs **450**A-E. Each floor slab **450**A-D will use steel channels as an edge form. These channels are cast into the slab **450**A-D to create the finished edge of the slab **450**A-D.

Upon constructing the structural steel columns, the casting of the typical floor and roof slabs may begin. If using the plaza/retail level **110** slab as a base, the building's typical floor slabs and the roof slab are poured one on-top-of the other, using the slab **450** below as the formwork for the slab **450** above. All of the slabs **450** will remain stacked on the plaza/retail level **110** surface until the slabs **450** have cured and reached the desired design strength. Upon curing, the slabs **110** are ready to be hoisted or lifted up to their finished elevation via a series of strand jacks mounted on the load bearing steel framing. Upon creating all of the slabs **450**, each of the floor and ceiling slabs **450** will then be lifted or hoisted up to the appropriate elevation level via strand jacks that are mounted on each horizontal column **410**A-**410**E so that every slab **450** is securely positioned and attached at every level of the building so that a plurality of non-weight bearing walls **505**, **520**, **535**, **510**, **515** (as described later), a plurality of interior components **555**, **525**, **562**, **565**, **567**, **568**, **559**, **557**, **571**, **570**, **573** (as described later) and a plurality of exterior components **730**, **800**, **803**, **815** (as described later) are installed at every level in between a floor slab and a ceiling slab **450**A-E at each level.

The present construction system and method of constructing energy efficient multi-story buildings with a plurality of units comprises: premanufacturing a plurality of non-weight bearing walls, the plurality of non-weight bearing walls with finished exterior including all electrical, insulating, plumbing and communications components; premanufacturing a plurality of interior components adapted to connect to the plurality of non-weight bearing walls; premanufacturing a plurality of exterior components adapted to attach to exterior surfaces of the multi-story building; transporting the premanufactured and prefinished plurality of non-weight bearing walls, the plurality of interior components, and the plurality of exterior components to a building site; preparing a foundation for the multi-story building at the building site for providing support to a plurality of load-bearing structural columns; constructing the plurality of load-bearing structural columns of the building at the building site; forming floor and ceiling slabs to attach to the plurality of structural columns at each level of the building; lifting each of the floor and ceiling slabs to attach to each of the plurality of structural columns at the each level while installing stairs and elevators to attach to the plurality of structural columns and the floor and ceiling slabs; installing the plurality of non-weight bearing walls and the plurality of interior components between the floor and ceiling slabs at the each level of the building; installing the plurality of exterior components on exterior surfaces of the building; and installing stairs and elevators to attach to the plurality of structural columns and the floor and ceiling slabs; wherein the plurality of non-weight bearing walls, the plurality of interior components, and the plurality of exterior components are assembled and installed to provide the energy efficient multi-story building with the plurality of units with different floor plans and optionally a retail level with underground parking.

Using the first method of construction, the step of installing the plurality of non-weight bearing walls, the plurality of interior components and the plurality of exterior components

for a plurality of standard single units comprises: installing exterior window walls on exterior sides of the plurality of standard single units and partially enclosing each of the plurality of standard single units; installing demising walls in a perpendicular direction interfacing with the exterior window walls and partially enclosing the each of the plurality of standard single units; installing utility walls on the interior sides of the plurality of standard single units in a perpendicular direction interfacing with the demising walls and connecting with the demising walls to completely enclose the each of the plurality of standard single units; installing end walls on the exterior sides of the plurality of standard single units at ends of the building in a parallel direction as the demising walls and completely enclosing the each of the plurality of standard single units located at the ends of the building; installing bathroom floor pans into a preformed recess within the floor and ceiling slabs in the each of the plurality of standard single units; connecting utilities and plumbing fixtures to the utility walls; installing entry doors adjacently positioned by the utility walls; installing interior partitions within the each of the plurality of standard single units for separating rooms and configuring the each of the plurality of standard single units; installing kitchen and bathroom components to the utility walls; installing roof components on top of the building; and assembling exterior walkways depending on the building's configuration.

An alternative method may include lifting the top or roof slab **450**E (also referred to as a first ceiling slab) all the way to the top at roof of the building. Immediately after securing the first ceiling slab **450**E, a plurality of non-weight bearing walls **520**, **535**, **510**, **515**, except for the exterior window walls **505**, (as described later) and some of the plurality of interior components **555**, **559**, **557**, **571**, **570**, **573** (as described later), including the bathroom floor pans **555**, kitchen and bathroom components **559**, **557**, **570**, **571**, **573** are installed on a second slab **450**D beneath the first slab **450**E that is not yet lifted and securely attached to the first slab **450**E. Upon installation of the plurality of non-weight bearing walls **520**, **535**, **510**, **515** (as described later) and some of the plurality of interior components **555**, **559**, **557**, **571**, **570**, **573** (as described later), and upon loading of the exterior window walls **505** and rest of the plurality of interior components **525**, **562**, **565**, **567**, **568** on the second slab **450**D below, the second slab **450**D with the plurality of non-weight bearing walls **505**, **520**, **535**, **510**, **515**, the second slab **450**D is lifted or hoisted up under the first slab at the top **450**E and securely attached to the first slab **450**E to make the top floor or level.

Upon securely attaching the second slab **450**D to the first slab **450**E, the loaded exterior window walls **505** and the rest of the plurality of interior components **525**, **562**, **565**, **567**, **568**, including the entry doors **525** and interior partitions **562**, **565**, **567**, **568** are installed to the first slab **450**E to complete the top level of the building. A plurality of non-weight bearing walls **520**, **535**, **510**, **515**, except for the exterior window walls **505** and some of the plurality of interior components **555**, **559**, **557**, **571**, **570**, **573**, including the bathroom floor pans **555**, kitchen and bathroom components **559**, **557**, **570**, **571**, **573** are again installed on a third slab **450**C beneath the second slab **450**D. Similar to the previously described process for constructing the top level, the exterior window walls **505** and the rest of the plurality of interior components **525**, **562**, **565**, **567**, **568** are loaded on the third slab **450**C below, and the third slab **450**C with the plurality of non-weight bearing walls and the plurality of interior components, whether installed or loaded, is lifted up or hoisted up under the second slab **450**D to make a level beneath the top level. The exterior window walls **505** and the rest of the plurality of interior components **525**, **562**, **565**, **567**, **568** are installed to the second slab **450**D after the third slab **450**C is securely attached to the second slab **450**D. This process of installing and loading the plurality of non-weight bearing walls and the plurality of the interior components is repeated until all the levels of the building is completed. A plurality of exterior components **730**, **800**, **803**, **815** (as described later) are installed on exterior surfaces of the building after the plurality of non-weight bearing walls and plurality of interior components are completely installed.

A method of constructing an energy efficient multi-story building with a plurality of units comprises: (a) premanufacturing a plurality of non-weight bearing walls, the plurality of non-weight bearing walls with finished exterior including all electrical, insulating, plumbing and communications components; (b) premanufacturing a plurality of interior components adapted to connect to the plurality of non-weight bearing walls; (c) premanufacturing a plurality of exterior components adapted to attach to exterior surfaces of the multi-story building; (d) transporting the premanufactured and prefinished plurality of non-weight bearing walls, the plurality of interior components, and the plurality of exterior components to a building site; (e) preparing a foundation for the multi-story building at the building site for providing support to a plurality of load-bearing structural columns; (f) constructing the plurality of load-bearing structural columns of the building at the building site; (g) forming a plurality of floor and ceiling slabs to attach to the plurality of structural columns at each level of the building; (h) lifting a first slab from the plurality of floor and ceiling slabs up to top of the building; (i) installing the plurality of non-weight bearing walls other than exterior window walls and some of the plurality of interior components on a second slab located beneath the first ceiling slab; (j) loading the exterior window walls and rest of the plurality of interior components on the second slab; (k) lifting the second slab with the plurality of non-weight bearing walls and the plurality of interior components whether installed or loaded immediately beneath the first ceiling slab; (l) attaching securely the second slab to the plurality of structural columns located immediately below the first slab to form a top level; (m) installing the exterior window walls, the rest of the plurality of interior components to the first slab to complete the top level; (n) repeating steps (i) through (m) until all levels of the building are completed; (o) installing a plurality of exterior components on exterior surfaces of the building; and (p) installing stairs and elevators to attach to the plurality of structural columns and the floor and ceiling slabs; wherein the plurality of non-weight bearing walls, the plurality of interior components, and the plurality of exterior components are assembled and installed to provide the energy efficient multi-story building with the plurality of units with different floor plans and, optionally, a retail level with underground parking.

Using the second method of construction, the step of installing the plurality of non-weight bearing walls, the plurality of interior components, and the plurality of exterior components for a plurality of standard single units comprises: (a) installing demising walls and partially enclosing the each of the plurality of standard single units; (b) installing utility walls on the interior sides of the plurality of standard single units in a perpendicular direction interfacing with the demising walls and connecting with the demising walls to partially enclose the each of the plurality of standard single units; (c) installing end walls on the exterior sides of the plurality of standard single units at ends of the building in a parallel direction as the demising walls and substantially enclosing the each of the plurality of standard single units located at the

ends of the building; (d) installing bathroom floor pans into a preformed recess within the floor and ceiling slabs in the each of the plurality of standard single units; (e) installing kitchen and bathroom components to the utility walls; (f) connecting utilities and plumbing fixtures to the utility walls; (g) loading exterior window walls, entry doors and interior partitions on the second floor slab before securely attaching the second slab to the plurality of structural columns located immediately below the first slab; (h) installing the exterior window walls on exterior sides of the plurality of standard single units and to the first slab completely enclosing each of the plurality of standard single units after securely attaching the second slab to the plurality of structural columns located immediately below first slab; (i) installing the entry doors adjacently positioned by the utility walls and to the first slab after securely attaching the second slab to the plurality of structural columns located immediately below the first slab; (j) installing the interior partitions within the each of the plurality of standard single units for separating rooms and configuring the each of the plurality of standard single units, and to the first slab after securely attaching the second slab to the plurality of structural columns located immediately below the first slab to complete the top level; (k) repeating steps (a) through (j) until all levels of the building are completed; (l) installing roof components on top of the building; and (m) assembling exterior walkways depending on the building's configuration.

Upon suspending the slab **450**A-E at its appropriate elevation level, each slab **450**A-E is bolted to the vertical columns **405** which are load bearing steel framing. For example, the first floor and ceiling slab **450**A is held and supported by the vertical columns **405** at the first horizontal support column **410**A. The second floor and ceiling slab **450**B are held and supported by the vertical column **405** at the second horizontal support column **410**B. The third floor and ceiling slab **450**C is held and supported by the vertical columns **405** at the third horizontal support column **410**C. The fourth floor slab **450**D is held and supported by the vertical columns **405** at the fourth horizontal support column **410**D. The fifth floor slab **450**E is held and supported by the vertical columns **405** at the fifth horizontal support column **410**E. Conventional steel reinforcing bars can be used in the slabs **450**A-E. The span of the slab **450**A-E is set at a distance that can be supported within the depth and width of the slab **450**A-E. Upon placing the slabs **450**A-E at appropriate elevation levels, they will fully support their spans without the use of supplemental beams or columns. Electric radiant heat coils can be incorporated into the concrete floor and ceiling slabs **450** to heat each unit.

The structural, floor and ceiling slabs **450**A-E act as the finished floor slab for the unit above and the finished ceiling slab for the unit below. The floor and ceiling of the units are exposed surfaces of concrete slabs **450**A-E. Acoustical isolation at the slabs **450**A-E is achieved by requiring the tenant to provide throw rugs or other approved floor covering over minimal area of the slab **450**A-E.

FIGS. **10**A-B illustrate a components plan of an exemplary studio unit **300**B for various walls and components before and after assembly. As shown in FIGS. **10**A-B of the exemplary studio unit **300**B, the studio unit **300**B is enclosed by the exterior window walls **505**B, exterior window wall panels **505**G, demising walls **520**A-B, utility wall **535**. The studio unit **300**B further includes interior components such as a kitchen unit **570**, bathroom floor pan **555**, bathroom vanity **557**, toilet **559**, shower base **560** with first and second bathroom wall finishes **563**A-B and its first and second shower partitions **562**A-B, and reconfigurable partition **565** separating the bathroom from the kitchen area. The exterior window wall panels **505**G are used as fillers and positioned inbetween the exterior window walls **505**B. On the opposing side of the exterior window walls **505**A-B in a parallel direction, the utility wall **535** is installed for connecting the bathroom and kitchen components. The entry door **525** is positioned at the right lower-hand corner of the utility plumbing walls **535** for easy entry into the studio unit **300**B.

Each of the demising walls **520**A-B is positioned directly opposite of each other in a parallel direction to enclose the studio unit **300**B. The bathroom floor pan **555** contains a toilet **559**, a bathroom vanity **557**, and a shower base **560**. The bathroom floor pan **555** is positioned in the left-hand corner against the utility wall **535** and the second demising wall **520**B next to the kitchen island **575**. The shower **566** (later shown in FIG. **26**) is partitioned off by the first and second shower partitions **562**A-B, and first and second bathroom wall finishes **563**A-B. The bathroom is partitioned off by the sliding bathroom door **558** attached to the second shower partition **562**B and reconfigurable partition **565** on the lateral side of the bathroom. Immediately adjacent to the bathroom, the kitchen unit **570** is installed against the utility wall **535** that has a stove **572**, a kitchen sink **571**, and cabinets (not shown in FIG. **10**). Other internal furniture such as a bed, desks, chairs, dresser, coffee table, and couches may be placed anywhere.

FIGS. **11**A-B illustrate component plans of an exemplary two-bedroom unit for various walls and components before and after assembly. As shown in FIGS. **11**A-B of the exemplary two-bedroom unit **300**E, the two-bedroom unit **300**E is enclosed by exterior window walls **505**A-C, exterior window wall panel **505**G, demising walls **520**A-B, and utility wall **535**. The two-bedroom unit **300**E further includes interior components such as a kitchen unit **570**, bathroom floor pan **555**, bathroom vanity **557**, toilet **559**, shower base **560** with bathroom wall finishes **563**A-B and its first and second shower partitions **562**A-B, reconfigurable glass partition **567** that separates the bedroom from the living room, and reconfigurable partitions **565**A-C further separating each bedroom from the other. Each of the bedrooms can be closed off by closing the slidable bedroom doors **568**A-B attached to the reconfigurable partitions **565**A-B. Similar to the studio unit, the exterior window wall panel **505**G is used as a filler and positioned inbetween the first and second exterior window walls **505**A-B.

On the opposing side of the exterior window walls **505**A-C and exterior window wall panel **505**G in a parallel direction, the utility wall **535** is installed for connecting the bathroom and kitchen components. An exterior wall **510** is also installed adjacent to the utility walls **535** after the first entry door **525**. The exterior wall **510** encloses a portion of the first bedroom of the two-bedroom unit **300**E. The entry door **525** is positioned and installed at the corner of the utility walls **535** for easy entry into the unit **300**E. An entry door **525** may also be located in the exterior wall **510**.

The demising wall **520**A-B is positioned directly between the units at the end of the exterior window walls **505**A-B in a parallel direction to enclose the two-bedroom unit **300**E. The bathroom floor pan **555** contains a toilet **559**, a bathroom vanity **557**, and a shower base **560**. The bathroom floor pan **555** is positioned and installed in a pre-fabricated recess (as shown in later figures), wall finishes **563**A-B in the middle area against the utility wall **535** next to the kitchen unit **570** with the kitchen sink **571**, stove **572**, countertop, and cabinets (as shown in later figures). The shower base **560** is partitioned off by the first and second shower partitions **562**A-B. The bathroom is partitioned off by the sliding bathroom door **558** that is attached to the second shower partition **562**B and reconfigurable partitions **565**A-B on each lateral side of the

bathroom. Immediately adjacent to the bathroom, the kitchen unit **570** is installed against the utility wall **535** that has the stove **572**, sink **571**, and cabinets. Other internal furniture such as a bed, desk, chair, dresser, coffee table, and couches may be placed anywhere.

Alternatively, FIGS. **11**C-D illustrate component plans of a second exemplary two-bedroom unit for various walls and components before and after assembly. For example, the exterior wall **510** is interchangeable with different walls such as using two layers of exterior walls **510**A-**510**B. The reconfigurable glass partition **567** that separates the bedroom from the living room is interchangeable with a regular reconfigurable partition **565**A. Any of the layouts are flexible and walls as well as components can be changed around.

FIGS. **12-13** illustrate an overview of wall construction of the units of the present invention. In an effort to keep the construction as efficient as possible for on-site staging, storage of materials, walls and components are minimal. All of the fundamental elements of the building are delivered to the site as pre-fabricated and pre-finished components. These pre-fabricated and pre-finished components include all exterior walls, demising walls, interior partitions, all kitchen and bathroom units, and other components. Walls are typically delivered as large a component as possible and unless noted otherwise, are hoisted directly from the truck to their final location for immediate installation.

More specifically, FIGS. **12**A-F illustrate a perspective view of different phases of assembling an exemplary studio unit and its interior components. FIG. **12**A illustrates an exemplary studio unit floor **590** of the slab with a recess **595** for the bathroom floor pan **555**. After the slabs **450** are in place the demising walls **520**A-B are delivered to the site. Each of the demising walls **520**A-B is hoisted as a single wall component and staged in the studio unit. In this particular embodiment, the demising wall **520** is single 19'-0" long component. However, depending on the overall plan, the dimensions of the demising wall **520** are easily changeable and not limited to these dimensions. The demising walls **520**A-B are merely positioned and are not installed until installation of the exterior window wall **505** is complete. As shown in FIG. **12**B, the demising walls **520**A-B are delivered to the site as a preassembled, prewired and prefinished component with sprinklers.

As shown in FIG. **12**C, the demising walls **520**A-B are installed to enclose the studio unit. In the next step as shown in FIG. **12**E, the bathroom floor pan is fitted into the recess **595** before installing the bathroom and kitchen components. As shown in FIG. **12**D, a utility wall **535** is installed so that a toilet **559** and a bathroom vanity **557** can be installed on top of the bathroom floor pan **555** and against the utility walls **535**. Immediately adjacent to the bathroom, a kitchen unit **570** with a stove **572**, cabinets **573**, kitchen sink **571** with a countertop. As shown in FIG. **12**F, the reconfigurable partition **565** separates the bathroom from the kitchen. The shower partition **562** separates the shower **566** and bathroom **553** from the living space area. The entry door **525** may be installed either after or before installation of the bathroom and kitchen components. The details of attachment of the demising walls **520**A-B to the studio unit floor **590** or slab **450** are described in and more readily understood in FIG. **19**.

FIGS. **13**A-F illustrate a perspective view of different phases of assembling an exemplary two-bedroom unit. Similar to assembling the studio unit as shown in FIGS. **12**A-F, the demising wall **520** that is delivered to the site as a preassembled, prewired and prefinished component is hoisted up to the unit and staged to be installed after installation of the exterior window walls **505**A-C. As shown in FIG. **12**B, the bathroom floor pan **555** is similarly fitted into the recess **595** for easily installing the bathroom components. A utility wall **535** is installed to enclose the two-bedroom unit. All the internal bathroom and kitchen components are similarly installed as described in FIG. **12**. The two bedrooms are separated from each other by a first reconfigurable partition **565**A. Each of the bedroom is separated from the living space by second and third reconfigurable partitions **565**B-C. Each of the second and third reconfigurable partitions **565**B-C have an attached sliding bedroom door **568** for privacy. The bathroom also has a sliding bathroom door **558** that is attached to the shower partition **562** that also separates the bathroom. The second reconfiguration partition **565**B is interchangeable with a reconfigurable glass partition **567** for allowing more light into the bedroom. On the side of the utility walls **535**, an entry door **525** within an exterior wall and an exterior wall **510** are installed to fully enclose the two-bedroom unit.

As shown in FIG. **13**C-F, there are two types of insulated walls, including but not limited to the exterior window walls **505**A-C. These exterior window walls **505** are delivered to the site as pre-assembled and pre-finished components for rapid installation. Exterior window walls **505**A-C are installed on the exterior sides of the units one right after the other at the general contractor's discretion. Upon installing the exterior window walls **505**A-D, they provide a fully weather-sealed, exterior wall system for the plurality of units.

FIGS. **14**A-G illustrate side and top views of various configurations of the exterior window walls **505** for various units. The exterior window walls **505**A, **505**B, **505**D, **505**E and **505**F have operable windows **509** for easily opening the windows for outside access. The operable windows **509** are swinging, sliding or other mechanisms by which windows are opened. In this exemplary embodiment, the exterior window wall **505**C does not have a swinging or sliding window **509**. The operable windows **509** may be opaque windows so that light is not easily penetrated or clear windows. Any of these exterior window walls **505** may be installed to accommodate different layouts of units. All of the exterior window walls **505** are delivered to the site for rapid installation.

FIGS. **15-16** illustrate sectional details of structural members for attaching exterior window walls **505**, **605** to the structural frame **600**, **610** and slab **650**. The top and bottom exterior window walls **605**A, **605**B are each supported at the edges by support members **610**A, **610**B. In order to install exterior window walls **605**A, **605**B, an anchor **612** in the shape of an L with outer ledges bent inwardly is first placed and anchored to the slab **650** by vertically inserting a fastener **621**A at the middle portion of the bottom side of the anchor **612** into the slab **650**. The top anchor block **625**A within the slab **650** receives and catches the first fastener **621**A to firmly secure the anchor **612** to the slab **650**. The anchor **612** is positioned on and anchored to the slab **650** to leave room for at least half of a large flashing **655** to fit on the remaining portion of the slab **650** towards the edge. Flexible, large flashing **655** is shaped around the adjacent components to make a step-like structure with two upper and lower horizontal portions and two upper and lower vertical portions. The flexible, large flashing **655**, which is waterproof, is positioned immediately next to the anchor **612** so that the exterior, vertical side of the anchor **612** fits with the upper vertical side of the large flashing **655** and the lower horizontal portion of the large flashing **655** fits snugly on the slab **650**. Half of the lower horizontal portion of the large flashing **655** protrudes out at the edge of the slab **650** as shown in FIGS. **15-16**.

A slip member **630** is then anchored firmly to the underside of the slab **650** at the ceiling portion or the head portion of the exterior window wall **605**B. The slip member **630** is shimmed

so that it is perfectly level to receive the bottom exterior window wall **605**B with the head support member **611**B and rests at its exact elevation. The exterior window walls **605**A, **605**B are constructed to allow approximately ⅝" of shim space at the top and bottom for leveling and alignment. A third fastener **621**C is used to attach a head wedge **615**B to the underside of the slab **650**. The bottom anchor block **625**B within the slab **650** receives and catches the third fastener **621**C to firmly secure the slip member **630** to the slab **650**. The small flashing **617** is used to seal the head wedge **615**B. Upon anchoring the slip member **630**A to its proper position under the slab **650**, the exterior window wall **605**B with the head support member **611**B is inserted into the slip member **630**A. Upon securing the head portion of the exterior window wall **605**B with the slip member **630**B, the bottom portion of the exterior window wall **605**A is positioned tightly against the anchor **612** and at the bottom side (not shown in this figure) of the exterior window wall **605**B. As shown in FIG. **16**, a bottom wedge **615**A is attached on top of the slab **650** with the large flashing **655** inbetween before positioning the exterior window wall **605**A against the anchor **612**.

The exterior window walls **605** already have integrated insulating panels **630** which are already included during manufacturing. Therefore, the exterior window walls **605** are installed and enclosed by trims **617** without a need to place any insulating panels **620** around the horizontal columns **610** to insulate the slab **650** and the exterior window walls **605**A-B from outer air and moisture. The completely assembled exterior window walls **605**A-B are shown in FIG. **16**.

The next method of constructing a building is installing end walls **515**, particularly when a unit is located in the middle of a building **101**, **102**, **103**. A living unit that is located in the middle of a building **101**, **102**, **103**, is enclosed between two demising walls **520** that are parallel to one another. In this case, both the demising walls **520**A-B with its structural members are placed one after the other. However, for a living unit that is located at the end of a building **101**, **102**, **103**, the end unit requires installation of an end wall **515** in lieu of a second demising wall **520**B or an exterior window wall **505**, **605**. The preferred sequence is to install the end wall **515** with its structural members immediately following installation of the exterior window walls **505**, **605** as shown in previous FIGS. **15-16**. This sequence of events helps to enclose the construction as soon as possible.

FIG. **36** illustrates cross-sectional details of end walls **515**A-B, before attaching a final panel **661**A made of metal or other similar materials to the exterior surfaces of the end walls **515**A-B and floor and ceiling slab **650** located inbetween. FIGS. **37**A-B illustrate cross-sectional details of end walls of FIG. **36** after attaching the final panel **661**A to the exterior surfaces of the end walls **515**A-B and floor and ceiling slab **650** located inbetween. An exemplary end wall **515** is composed of 3⅝" metal stud framing with batt insulation, sprinkler plumbing, electrical, and communications components. The wiring and plumbing are pre-installed at a factory and connected at the site. The interior side of the end wall **515** receives a layer of fire-rated, inner wall panel **657**A-B with a finished panel **660**. The inner wall panel **657**A-B is preferably a 12 mm magnesium oxide board, however, other types of fire-rated wall panels with safety mechanisms may be used and is not meant to be limiting. The finish for the inner wall panel **657**A-B may be determined from several options that are available and attached over the interior side of the end wall **515** at a factory to pre-manufacture the end walls **515**. An exemplary finish is a finished panel **660** over the inner wall panel **657**A-B. Examples of a finish would include stain, paint, an additional layer of magnesium-oxide board, wood vaneer, wood paneling, plaster, metal, wallpaper, and cork among others. The exterior side of the end wall **515** receives a pre-finished metal panel **661** that is also insulated. Furthermore, pre-finished trims **682**A-B cover the interior bottom and head portions of the end walls **515**A-B. Removable, pre-finished trims **682**A-B are placed to conceal the wall insulation and connections of the head and bottom portions of the end walls **515**A-B.

A base anchor **612**A is securely attached to the slab **650** using a first fastener **621**A that is drilled vertically down into the slab **650** for receiving the bottom portion of the end wall **515**A. A second anchor **612**B is also drilled upwardly into the slab **650** to securely attach the head anchor **612**E to the underside of the slab **650**. The end wall **515** utilizes a thermally insulated anchors **612**A-B that are securely attached to the slab **650** prior to installing the end wall **515**A-B. The end walls **515** are suspended via a crane and moved into place from the exterior of the building. The end wall **515**A is set onto the slab **650** and secured into place via access from the interior face of the building. Simultaneously, the head portion of the end wall **515**B is placed into the slip member **630** and secured in place. In order to secure the head portion of the end wall **515**B to the anchor **612**B, a third fastener **621**C is securely inserted horizontally through the vertical side of the anchor **612**B and into the end wall **515**B. The vertical portion of the anchor **612**B has pre-punched slots (not shown in figures) through which the third fastener **621** is screwed horizontally to accommodate vertical movement of the end wall **515**B due to vibration of the slab **650**. Consequently, a horizontal gap **673** allows slight, vertical deflection of the slab **650**. A vertical gap **672** also allows horizontal movement of the slab **650**. These gaps **672**, **673** may be filled with fire safing materials **670** prior to attaching the metal panel **661**.

A final insulated metal panel **661**A and a painted sheet metal trims **665**A-B are installed once the end walls **515**A-B are securely anchored into place. Normally, the metal panels **661**B-C on the exterior side of the end walls **515**A-B are pre-manufactured and already attached to the end walls **515**A-B. However, the final metal panel **661**A is attached after complete installation of the end walls **515**A-B to conceal and insulate the exterior edge of the slab **650** located between the two end walls **515**A-B.

FIG. **37**B illustrates the cross-sectional details of connecting the final metal panel **661**A to the other metal panels **661**B-C that are already pre-attached to the two end walls **515**A-B. The upper portion **662** and lower portion **663** of the metal panels **661** are oppositely identical in that the portions **662**, **663** are protruding structures extending around 3" that may fit together with other metal panels **661**. The width of the upper and lower portions **662**, **663** is about half of the width of the metal panel **661**. A clip member **680** shaped as a rigid S is attached to the end wall **515**A by a fastener **681** inserted horizontally through the clip member **680** into the end wall **515**A. The upper portion of the first clip member **680** that fits vertically into a small, space **677** of the lower portion **663**B of the metal panel **661**B and holds the lower portion **663**B to the end wall **515**A. A metal trim **682** is also attached to the end wall **515**A by the same fastener **681** that holds the first clip member **680** to the end wall **515**A. A latch **684** shaped as an L that protrudes out from the upper portion **662**A of the final metal panel **661**A. The metal trim **682** catches onto and over the latch **684** to hold the final metal panel **661**A to the end wall **515**A. Upon installing the final metal panel **661**A and the metal trim **682**, a backer rod **683** is sealed at the joint between the two metal panels **661**A-B and over the panel fastener **681** to cover the joint. The installation of this final metal panel

661A and trim 682 complete the installation of the end walls 515A-B creating a weather-tight and water-tight system.

The next step of constructing a building for the present invention involves placing or installing the demising walls 520A-B as shown in FIGS. 19-25. FIG. 19 illustrates completely installed demising walls 520A-B to the floor and ceiling slab 650. As shown in FIG. 21, the exemplary demising wall 520 has a head section 641A and a base section 641B. The demising wall 520 is composed of staggered 3⅝" metal stud framing 635 with acoustical blanket insulation layer 637, electrical connections 639, sprinklers, and communications components. The acoustical insulation layer 637 is preferably 2" to 3" thick with weave-thru studs and has sound transmission class (STC) rating of at least 55 or higher. The life-safety wiring is pre-installed at the factory and connected at the site of constructing the walls 520 and building. Both sides of the demising wall 520 receive a layer of fire-rated, 12 mm magnesium oxide board finish. The finish for the finish panel 660 may be determined from several options that are available and attached over both sides of the demising wall 520 at a factory when the demising walls 520 are pre-manufactured. An exemplary finish is a finished panel 660A-D such as stain, paint, an additional layer of magnesium-oxide board, wood vaneer, wood paneling, plaster, metal, wallpaper, and cork among others. A preferred application for the inner wall panel 657 is a 12 mm magnesium oxide board, however, other similar fire-rated panels or materials may be used. The head and base sections 641A, 641B are each protected and lines with magnesium oxide boards on the inside for acoustical damping or that are preferably made of similar materials of strength and durability.

As shown in FIG. 22C, the first step of installing the demising wall 520 utilizes pre-finished, acoustically sealed support members 685A-B and fire-insulated, first and second base anchors 686A-B which are secured to the top and under sides of the floor and ceiling slabs 650. As shown in detail in FIG. 22A, the horizontal section of the L-shaped base support member 685A has a pre-drilled hole 688A to receive the base fastener 687A for securely attaching the base support member 685A to the slab 650. Therefore, the base support member 685A is securely attached to the top portion of the slab 650 by drilling the base fastener 687A through the hole 688A, the pad 690 and into the slab 650. The pad 690 is approximately 3½" long that is positioned immediately beneath the horizontal section of the base support member 685A. Adjacent to the pad 690, fire-sealant tape 693A-B is placed on each side of the pad 690 before drilling the base fastener 687A into the slab 650.

As shown in FIG. 23, upon securely attaching the support members 685 to the top and under sides of the slab 650, the entire demising wall 520A is set onto the base support member 685A and secured into place. Simultaneously, the head section of the demising wall 520B is placed adjacent to and inside the head anchors 686B and securely positioned into place. The next step is to insert a support fastener 689A horizontally from the vertical side of the head support member 685B through the demising wall 520B. In FIG. 20-23, the head support member 685B has pre-determined slots (not actually shown in figures) to allow vertical movement from slab 650 vibration after support fastener 689A attachment between the vertical side of the head support member 685B and the head portion of the second wall 641A. In FIG. 24, the next step is to cover the inner side of the demising wall 520A by attaching the trim 682, preferably made of metal or other similar materials. More specifically, the trim 682 is preferably made of aluminum. After the trim 682 is attached, the inner side of the demising wall 520A is backed by a magnesium oxide board. A trim fastener 678 is horizontally inserted into the demising wall 520A.

The next step is filling the horizontal gap 673 created between the underside of the slab 650 and the head portion of the demising wall 520B with fire safing materials 670. The next step is sealing any open spaces between the slab 650 and the base portion of the demising wall 520A with caulk, preferably fire-resistant caulk, to prevent any fire from getting through the space. Caulk or similar fire-resistant material is also used to seal the space between the horizontal portion of the head support member 685B and the head portion of the demising wall 520B whereby the fire safing materials 670 are inserted. This horizontal gap whereby the fire safing materials 670 are filled also allows vertical movement of the slab 650 due to vibration. Upon sealing the open spaces between the demising walls 520A-B and the slab 650, the first and second trims 682A-B are attached on each side of the demising wall 520B at the head portion. Removable, pre-finished pressure-fit trim 682 conceals bottom of the wall connections. The first and second trims 682A-B are substantially Z-shaped with an upper vertical portion and a lower vertical portion connected by an upper horizontal portion. The lower vertical portion also has a perpendicular, lower horizontal portion. The trims 682 also have a preattached fire rated, wall panel on the inside. The lower horizontal portions of the trims 682A-B are inserted between the slab 650, pad 690 and a horizontal portion of the already attached head support member 685B until the inner fire rated wall panel on the trims 682A-B touch the demising wall 520B as shown in FIG. 24. The pad 690 is preferably made of neoprene, however, other types of similar materials can be used. The removable, pre-finished, pressure-fit trims 682A-B conceal the fire-safing 670 and connections.

FIG. 25 illustrates top views and cross-sectional details of the interface between a demising wall 520 with exterior window walls 505 and entry doors 525. In FIG. 25A, a top view of the demising wall 520 interfacing with the exterior window walls 505 is illustrated. The first window member 695A is positioned on the right side of the closure panel 699A after attaching the exterior window walls 505 and window member 695A to the floor and ceiling slab 650 (as described in FIG. 15). Closure panel 699A with integral insulation 696 is slid into place attaching to the window member 695A and then attached at the floor and ceiling slab 650 (as described in FIG. 15). Next exterior window wall 505 with a second window member 695B is placed to the left of the closure panel 699A and secured in the same manner. The first and second window members 695A-B on each side of the closure panel 699A are approximately 10" long and positioned to support the exterior window walls 505 against the demising wall 520. Upon secure attachment of the exterior window walls 505A-B, the demising wall 520 is positioned and secured. Upon secure attachment of the demising walls 520, the rods 698A-D, fire safing 670, trims 691C-D, and fire caulking 674 are provided between the demising wall 520 and the exterior window walls 505A-B. Similarly, the rods 698A-D, trims 691C-D, and fire safing 670 and fire caulking 674 are inserted between the demising wall 520 and the closing panel 699B once the demising walls 520 and entry doors 700A-B are securely positioned perpendicularly. The first door member 700A is positioned on the right side of the closure panel 699B after attaching the exterior window walls 525 and first window member 700A to the floor and ceiling slab 650 (as described in FIG. 35). Closure panel 699 with integral insulation 696 is slid into place attaching to the entry doors 700A and then attached at the floor and ceiling slab 650 (as described in FIG. 35). Next window wall 525 with a second window wall mem-

ber **700**B is placed to the left of the closure panel **699**B and secured in the same manner. The entry doors **525**A-B are attached on the door members **700**A-B on each side of the closure panel **699**B. The entry doors **525**A-B, more specifically the door portions are swinging doors, are hingedly attached to the door members **700**A-B of the closure panel **699**B.

FIG. **27** illustrates cross-sectional details of utility walls **535** installed above and beneath the floor and ceiling slab **650** for interior plumbing assembly. The recess **595** for the bathroom floor pan **555** extends underneath the utility wall **535** to allow the drain **556** to connect to a waste-line plumbing inside of the plumbing chase to avoid exposing drain lines at the ceiling slab **650** of the unit below. Each unit **300**A-H as shown in FIG. **6** has a utility wall **535** at the end of every kitchen and bathroom. The utility wall **535** houses common mechanical, plumbing and electrical risers that serve the units **300**A-H. All of the utilities to and from the units are accessed at the utility wall **535**.

The next step of constructing a building is placing or installing utility walls **535**. FIG. **29** illustrates cross-sectional details of utility walls **535** attached to the floor and ceiling slab **650**. These utility walls **535** are delivered to the site as pre-assembled, pre-plumbed, pre-wired and pre-finished components. As shown in FIG. **29**, the utility walls **535** are finished on one side with the fire-rated, inner wall panels **657**A-B and the other side with outer metal panels **661**A-C. Other possible cladding materials comprise metal panel, cementitious board, phenolic resin board, wood siding, gypsum reinforced fiber cement panels, precast concrete panels, and ceramic tile. The exemplary utility wall **535** is composed of 20 GA metal stud framing **635** at 16" in the center, inner wall panels **657**A-B preferably made of 12 mm magnesium oxide board with a water resistant finish on the inner side of the utility wall **535**A-B. The utility wall **535** further includes an integrated 2½" acoustical blanket insulation layer **637**A-B within the utility wall **535**. The utility walls **535** arrive on site with all the wall plumbing associated with the kitchen sink **571**, toilet **559**, shower **566** already in place. The utility walls **535** also include all plumbing supply, vent and drain lines, shower valves **551**, shower head **561** and associated trim. The utility walls **535** further contain the unit's electrical panel **577**. The other side of the utility wall **535** is composed of 3⅝" 20 GA metal stud framing at 16" on center, ⅝" fire-rated wall board and, in the preferred application from a range of 2" to 3", if local climate requires it, integrated insulated metal panels with integral air and vapor barrier. The alternative exterior finish includes a layer of ½ cement board with a water resistant finish. Other exterior finish materials include cementitious board, phenolic resin board, wood siding, gypsum reinforced fiber cement panels, precast concrete panels, and ceramic tile.

Installation of the utility walls **535** utilizes a pre-finished, acoustically sealed head bracket member **685**A that is substantially shaped as an L, a head anchor **686**A at the head portion of the utility wall **535** which are securely attached to the ceiling slabs **650** with a pad **690** inbetween the head bracket member **685**A and the ceiling slab **650**. Installation of the utility walls **535** further utilizes base anchors **687**A-B at the base portion of the utility walls **535** to securely attach to the floor slabs **650**. First, the utility wall **535** is set onto the bathroom floor pan **555** of the floor slab **650** as shown in FIGS. **29-30** and secured into place by anchoring the utility wall **535** to the floor slab **650**. A first base anchor **687**A and a second base anchor **687**B through a top anchor block **625** are injected into the floor slab **650** to anchor the utility wall **535** over the bathroom floor pan **555** of the floor slab **650**.

Simultaneously, a head anchor **686**A is drilled upwardly into the slab **650** by permanently attaching a head bracket member **685**B to the underside of the slab **650** for attaching a utility wall **535**B. The head anchor **686**A may be a bolt or similar attachment means to securely attach the head bracket member **685**B to the slab **650**. The head portion of the utility wall **535**A-B is then securely tilted into the head bracket member **685**B while aligning the vertical portion of the angle member **671** with the vertical portion of the head bracket member **685**B. The utility wall **535** utilizes a thermally insulated head bracket member **685**B that is securely attached to the slab **650** prior to installing the utility wall **535**A-B. As shown in FIG. **29-30**, the utility wall **535** is tilted during installation of the wall **535** to catch the second head anchor **686**B in the slots (not shown in this figure.) on the vertical side of the angle member **671** and through the head bracket member **685**B attached above. As shown in FIGS. **29-30**, the base portion of the utility wall **535** is anchored directly to the slab **650** via first and second base anchors **687**A-B drilled vertically into the slab **650**. A horizontal gap **673** created between the underside of the slab **650** and head portion of the utility wall **535** allows slight, vertical deflection of the slab **650**. A vertical gap **672** created between the edge portion **651** of the slab **650** and a first metal panel **661**A also allows horizontal movement of the slab **650**. These horizontal and vertical gaps **672**, **673** may be filled with fire safing materials **670** prior to attaching the metal panel **661**B.

As shown in FIG. **29**, a second head anchor **686**B is drilled through the vertical portions of the angle member **671** and the head bracket member **685**B in a horizontal direction or perpendicular to the first head anchor **686**A to attach the angle member **671** of the utility wall **535**B to the head bracket member **685**B. The angle member **671** has pre-punched slots on the vertical portion of the L shape to allow any screw, fastener or other means to attach the angle member **671** of the demising wall **535**B to the head bracket member **685**B to accommodate any vertical movement of the utility wall **535**B caused by the vibrational movement of the slab **650**. Upon attaching the angle member **671** to the head bracket member **685** at the head portion, a prefinished trim **682**D, preferably with a backer board, substantially shaped as a Z or a step-like structure is placed over the head anchor assembly to cover the connections. The inner portion of the utility wall **535** that is adjacent to the shower **566** have a water resistant finish with a metal flashing to prevent water from entering between the bathroom floor pan **555** of the floor slab **650** and the utility wall **535**.

Upon securing the utility walls **535**, insulated metal panels **661**A-C are installed once the utility walls **535**A-B are securely anchored into place. Normally, the metal panels **661**B-C on the exterior side of the utility walls **535**A-B are pre-manufactured and already pre-finished by being attached to the exterior side of the utility walls **535**A-B. However, the final metal panels **661**A, **661**C are attached after complete installation of the utility walls **535**A-B to conceal and insulate the exterior edge **651** of the slab **650** located between the two utility walls **535**A-B. FIG. **32** illustrates the cross-sectional details of connecting the final metal panel **661**A, **661**C to the other metal panel **661**A that is already pre-attached to the two utility walls **535**A-B. The upper portion **662** and lower portion **663** of the metal panels **661** are oppositely identical in that the portions **662**, **663** are protruding structures extending out around 3" that may fit together with other, symmetrical metal panels **661**. The width of the upper and lower portions **662**, **663** is about half of the width of the metal panel **661**.

An angle-shaped panel attachment angle **679** is first secured to the utility wall **535**B with a fastener **681**B as shown

in FIG. **31** to allow for the attachment of the final metal panel **661**C. A clip member **680** shaped as a rigid S is attached to the utility wall **535**A by a panel fastener **681**A inserted horizontally through the clip member **680** into the utility wall **535**A. The upper portion of the first clip member **680** that fits vertically into a small, space **677** of the lower portion **663**B of the metal panel **661**B and holds the lower portion **663**B to the utility wall **535**A. A trim **682** is also attached to the exterior surface of the utility wall **535**A by the same fastener **681** that holds the first clip member **680** to the utility wall **535**A. The trim **682** is preferably made of metal but other similar materials can be used and is not meant to be limiting. A latch **684** shaped as an L that protrudes out from the upper portion **662**A of the final metal panel **661**A. The metal trim **682** catches onto and over the latch **684** to hold the final metal panel **661**A to the exterior plumbing wall **540**A. Upon installing the final metal panel **661**A and the metal trim **682**, a backer rod **683** is sealed at the joint between the two metal panels **661**A-B and over the panel fastener **681** to cover the joint. The installation of this final metal panel **661**A and trim **682** complete the installation of the utility walls **535**A-B creating a weather-tight and water-tight system.

The next step of constructing a building is connecting utility components and installing fixtures. All of the unit's utility connections occur at the utility walls **535**. The electrical and communications main lines run vertically in the utility wall **535**. At each unit, the electrical service feeds directly into the utility wall's **535** breaker panel. Wiring connections to other wall components occur via pre-installed wiring. Electrical and communications connections are carried out at the time of installation of each adjacent utility wall **535**. In FIG. **28**A, a side view of the utility wall **535** is shown without the bath and kitchen components in place. The bathroom floor pan **555** with the drain **556** is set in grout first after installing the utility wall **535**. The utility wall **535** has first and second vents **576**A-B located respectively in the bathroom **553** and kitchen **569** on top portions of the utility wall **535**. The utility wall **535** also has first and second plumbing **580**A-B for supply and waste for connecting the bathroom vanity **557** and sink **571**A with a sink and kitchen unit **570**. There are a plurality of outlets **581**A-H located in the utility wall **535** for the bathroom **553** and kitchen **569**. The utility wall **535** that arrives on-site also has pre-integrated shower head **561** and shower valves **551**.

FIG. **28**B illustrates the utility wall **535** with bathroom and kitchen components installed on the utility wall **535**. Installation of plumbing fixtures occur immediately after utility connections are made to the utility wall **535**. Sinks **571**A-B are pre-installed in the bathroom vanity **557** and kitchen unit **570**. Cabinets **573**A-B are delivered and installed immediately after the utility wall **535** is installed. All wiring within a given unit feed back to the unit's electrical panel **577**.

The next step of constructing a building is inserting a bathroom floor pan **555** and a shower base **560** with an integral drain **556** into a recess **595** within the floor slab **650**. The recess **595** or depression is cast into the slab **650** and shaped to receive the bathroom floor pan **555** and shower base **560**. The bathroom floor pan **555** is a pre-cast, pre-formed component with an integral shower base **560** and sloping floors towards the drain **556** for directing water to the drain **556**. The bathroom floor pan **555** is field set in grout after the installation of the utility wall **535**. In FIG. **26**B, the first shower partition **562**A is shown to divide the shower **566** portion from the bathroom **553** portion. The toilet **559** and bathroom vanity **557** are also shown. The next step of construction is placing exterior walls **510**. Living units that are 30 feet and wider may have a room against the exterior wall **510** at the chase wall side of the unit. If these rooms are to be used as bedrooms, building code may require that a door or window be provided that is large enough to accommodate egress. In these types of conditions, exterior walls **510** can be used. The exterior wall **510** is composed and anchored in exactly the same manner as the end walls **515** as shown in FIGS. **36-37**. The exterior walls **510** are provided in a different configuration than the end walls **515** since the exterior walls **510** have a window or door included. Similar to the end walls **515**, exterior walls **510** are composed of 3⅝" metal stud framing **635** with batt insulation layer **637**, electrical, communications, and life safety wiring which are installed at the factory and connected at the site. The interior side of the exterior wall **510** receives a layer of 12 mm magnesium oxide board or a finish panel **660** (finish to be determined from the several options available) attached over the wall board. The exterior side of the exterior wall **510** receive a pre-finished insulated metal panel **661**. The alternative exterior finish materials include cementitious board, phenolic resin board, wood siding, gypsum reinforced fiber cement panels, precast concrete panels, and ceramic tile. The exterior wall **510** utilizes a thermally insulated head anchor **612** with a pre-finished trim **682**. These anchors **612** are secured to the ceiling and floor slab **650**.

Similar to the end walls **515**, the exterior walls **510** are suspended via a crane and moved into place from the exterior of the building. The exterior walls **510** are set onto the floor slab **650** and secured into place. Simultaneously, the head portion of the exterior wall **510** is placed adjacent to the anchor **612** and secured into place. The vertical side of the head anchor **612** has pre-punched slots to allow screw or fastener attachment to occur between the anchor **612** and the exterior wall **510** to accommodate vertical movement caused by vibration of the slab **650**. An insulated metal panel **661** and removable, pre-finished metal trim **665** are installed at the head section to conceal the top of exterior wall **510** insulation and connections once the exterior walls **510** are securely anchored into place. The metal panel **661** conceals and insulates the vertical edge **651** of the slab **650**. Upon installing the final metal panel **661**A and the metal trim **682**, a backer rod **683** is sealed at the joint between the two metal panels **661**A-B and over the panel fastener **681** to cover the joint. The installation of this final metal panel **661**A and trim **682** complete the installation of the exterior walls **510** creating a weather-tight and water-tight system.

The next step of construction is installing the entry door **525**. The entry door **525** is a pre-assembled, pre-wired and pre-finished component. The entry door **525** comes with a door portion **705**, inner frame **707** to house the door portion **705**, outer frame **706** to support the entry door **525**, and an operable relight panel **704** positioned above the door portion **705**. All associated hardware for the door portion **705** is pre-installed except for thresholds or covers **710** to prevent bottom draft, an outer frame **706**, and a closure panel **699**. The closure panel **699** is preferably made of aluminum, however, other types of materials can be used to enclose the door assembly. The entry door **525** may come in a right-hand or a left-hand door configuration to accommodate different unit layouts. The entry door **525** has an operable relight panel **704** above the door portion **705**. Electrical connections to be made between walls such as the demising wall **520** and the utility wall **535** are made in the cavity between the door portion **705** and the operable relight panel **704**. As shown in FIGS. **34-35**, the entry door **525** is anchored to the floor via anchor clips **703**A-B provided at each side, and the anchor clips **703**A-B are used to attach the frames **706**, **707** to the floor slab **650**.

Upon installing the entry door **525**, the anchor clips **703**A-B are concealed under the unit's cover **710**.

The operable relight panel **704** of the entry door **525** is anchored to the ceiling slab **650** above via a head anchor **612** which is secured to the ceiling slab **650**. Attachment of the removable panel **704** of the entry door **525** is very similar to the head connection of the exterior window walls **505**, **605** as shown in FIG. **15**. The top of the entry door **525** is placed adjacent to the head anchor **612** and securely attached in place. The head anchor **612** has pre-punched slots to allow screw attachment to occur between the anchor **612** and the entry door **525** to accommodate vertical movement caused by vibration of the slab **650**. The connection at the head of the entry door **525** is covered by the removable panel **704** placed above the door. The wall cavity above the door houses the electrical connections linking the outlets in the demising wall **520** to the electrical service in the plumbing chase.

FIGS. **35**B-D illustrate attaching the head and base portions of the entry door **525** to the floor and ceiling slab **650**. The base portion of the entry door **525** is first set above the floor slab **650** so that the bottom portion **702** of the entry door **525** is sitting in a perpendicular direction from the bottom anchor block **625**B as shown in FIG. **35**B. The L-shaped anchor clip **703** is touching the front, bottom portion **702** of the entry door **525** and also sitting perpendicularly above the bottom anchor block **625**B so that first and second fasteners **621**A-B are drilled into the bottom portion **702** of the entry door **525** and bottom anchor block **625**B within the floor slab **650**. The cover **710** then is installed over the bottom portion **702** of the entry door **525** to make the ground level gradually declining from the door portion **705** to the floor slab **650**. At the head portion of the entry door **525**, a first slip member **630**A substantially L-shaped and a second slip member **630**B substantially C-shaped are connected at the top end to be anchored firmly to the underside of the slab **650** at the ceiling portion or the head portion of the entry door **525**. The slip member **630** is shimmed so that it is perfectly level to receive the head entry door **525** with the head support member **611**B and rests at its exact elevation. The entry doors **525** are constructed to allow approximately ⅝" of shim space at the top and bottom for leveling and alignment. A third fastener **621**C is used to attach a head wedge **615**B, positioned between the top anchor block **625**A and the two slip members **630** to the underside of the slab **650**. The top anchor block **625**A within the ceiling slab **650** receives and catches the third fastener **621**C to firmly secure the first and second slip members **630** to the slab **650**. The slip members **630** in turn securely hold both inner and outer sides of the entry door **525** by attaching on both sides as shown in FIGS. **35**C-D. A small flashing **617** is used to seal the head wedge **615**B.

Upon anchoring the slip members **630**A-B to its proper position under the slab **650**, the entry door **525** with the head support member **611**B is inserted into the slip members **630**A-B. Upon securing the head portion of the entry door **525** with the slip members **630**A-B, the bottom portion of the entry door **525** is positioned tightly against the anchor **612** and at the bottom side (not shown in this figure.) of the entry door **525**. As shown in FIG. **35**, a bottom wedge **615**A may be attached on top of the slab **650** with the large flashing **655** inbetween before positioning the entry door **525** against the head anchor **612**. The wall cavity above the entry door **525** houses the electrical connections linking the outlets in the demising wall **520** to the electrical service in the utility wall **535**.

FIGS. **34**A-B illustrate top views of the entry doors **525** attached adjacent to the utility wall **535** and perpendicularly attached to the demising wall **520**. Two entry doors **525** are currently shown to be installed side by side next to each other. The door portions **705**A-B are shown to be swinging doors which are currently open. The door portions **705**A-B can be made of glass or any other type of materials. FIG. **34**B illustrates a detailed and magnified top view of the outer frame **706** connecting adjacent to the utility wall **535**. The head anchor **612** shaped as an L is placed at the perpendicular corner created between the utility wall **535** and the inner frame **707** of the entry door **525** so that the first fastener **621**A is drilled through the anchor **612** into the inner frame **707** while the second fastener **621**B is drilled through the anchor **612** in a perpendicular direction from the first fastener **621**A into the utility wall **535**. The anchor **612** therefore anchors the entry door **525** against the right side of the utility wall **535** as shown in FIG. **34**B. Upon anchoring the entry door **525** to the utility wall **535**, the outer frame **706** is attached over the inner frame **707** to conceal the attachments of the entry door **525** to the utility wall **535**. Furthermore, a rod **683** and sealant are used in a channel created between the outer surface of the entry door **525**, more specifically the inner frame **707**, and the utility wall **535** whereby the entry door **525** was inserted into place before anchoring adjacently to the utility wall **535**. On the right side of the entry door **525** whereby the first entry door **525**A is adjacently attached to a second entry door **525**B and interfacing perpendicularly with a demising wall **520**, a closure panel **699**C is placed inbetween the two entry doors **525**A-B so prevent the space to be left open. As shown in FIG. **34**, the closure panel **699**C is inserted and attached between the two entry doors **525**A-B, more specifically two outer frames **706**A-B of the two entry doors **525**A-B.

The next step of construction is installing interior partitions **562**, **565**, **567** and bedroom doors **568** for separating rooms or configuring rooms with different layouts as shown in FIGS. **17-18**. Interior partitions **562**, **565**, **567** and bedroom doors **568** are minimal. In most cases, the interior partitions **562**, **565**, **567** and bedroom doors **568** are removable, and the location of the partitions is easily adjustable. The two main exemplary types of partitions include ⅜" tempered glass and 3" thick, full-height reconfigurable partitions. Shower partitions **562** for the bathroom are full height ⅜" tempered and frosted glass panels that fit into a head track **713**A and are held in place via wall anchors. A sliding bedroom door **568** mounted on a sliding door track **715** at the head portion and sitting over a sliding door guide **716** may also be provided as shown in FIGS. **17-18**. Head anchors **612**B and bottom anchors **612**A are brushed aluminum and attach directly to or drill into the surface of the floor and ceiling slabs **650** as shown in FIGS. **17-18**.

At the head portion of the partitions **562**, **565**, **567** and bedroom doors **568** whereby they attach to the bottom side of the ceiling slab **650**, a rigid C-shaped receptor channel **713**A is attached to the bottom side of the ceiling slab **560** using a first head anchor **612**B. The receptor channel **713**A is approximately 2" deep and 2" wide so that the top portion of the partition **565** is inserted at least half way to ¾" into the receptor channel **713**A. Before inserting the partition **565** into the receptor channel **713**A and set in place, shims **718** are placed between the vertical portions of the receptor channel **713**A and the top portion of the partition **565** to create friction and to provide additional support for securely holding the partition **565** in place. At the receptor channel **713** of the head portion, a continuous rubber glazing gasket **719** will be inserted between channel and partition to secure the panel onto place. Sealant will be provided at vertical wall joints where the glazing acts as a shower enclosure. The partition **565** is anchored to the walls via edge angles (not shown in this figure.).

A sliding bedroom door **568**, whether made of glass or other materials, is attached to a sliding door guide **715** previously attached to the ceiling slab **650** via a second head anchor **612**B. The sliding door guide **715** basically guides the sliding bedroom door **568** at the top portion so that it can slide open and close easily. The sliding bedroom door **568** is suspended from a sliding door track **715** mounted to the underside of the ceiling slab **650**. The protruding structure **733** from the top portion of the sliding bedroom door **568** extends into the sliding door track **715** and to catch the sliding door track **715**. A trim **714**, preferably made of aluminum or other types of materials, is used to attach the top portion of the sliding bedroom door **568** to the underside of the ceiling slab **650** via a second head anchor **612**B as shown in FIG. **17**B. The top part of the trim **714** is attached directly to the ceiling slab **650** and the bottom, side portion of the trim **714** is attached to top, side part of the sliding bedroom door **568** by linking the hook **748**.

At the bottom portion of the partition **565** and bedroom door **568**, a bottom receptor channel **713**C is attached to the floor slab **650** by a bottom anchor **612**A to insert a partition base member **711**. The partition base member **711** is fully positioned within the bottom receptor channel **713**C so that a third fastener or fastening means **717**D is horizontally drilled through the bottom receptor channel **713**C and into the partition base member **711** for securely attaching the bottom portion of the partition **565**. Furthermore, a sliding door guide **716** is adjacently positioned on the floor slab **650** next to the bottom receptor channel **713**C and attached to the floor slab **650** by drilling two bottom anchors **612**A through the flat portions of the sliding door guide **716** and into the floor slab **650**. The sliding bedroom door **568** has a groove **738** that fits over the protruding sliding door guide **716**. An attachment member **739** that extends below the end of the sliding door **568** keeps the sliding door **568** above the ground of the floor slab **650** for easy sliding of the door **568**. The majority of the weight of the sliding door **568** will be carried on rollers in ceiling-mounted track **715**. This mechanism is typically used between the kitchen and bathroom. The partitions **565** may also be used to help establish privacy between bedrooms. A 4" thick reconfigurable glass wall system will be used where partitions **565** are called for between living and dining areas and bedrooms. In these applications, the sliding aluminum and glass doors are suspended from a sliding door track that is supported by the wall system's vertical mullions.

The next step of construction is installing kitchen and bathroom components. As shown in FIGS. **28**A-B, toilets **559** are installed on the utility wall **535**. Bathroom vanities **557** arrive on site pre-assembled with the sink **571**A and associated out-of-wall plumbing pre-installed and ready for immediate connection to the building's systems. The shower base **560** and floor drain **556** are integral parts of the bathroom floor pan **555** as shown in FIG. **26**. Kitchen units **570** are pre-fabricated, pre-finished kitchen wall and base cabinets. These kitchen units **570** arrive at the site pre-drilled and trimmed for plumbing, electrical connections and vent ducting. Cabinets **573**B have integral exhaust fans and light fixtures to be installed on the utility wall **535**. Dishwasher and under-counter refrigerator are also delivered to be installed on the utility wall **535**.

The next step of construction is installing parapet wall **730** for the roof as shown in FIGS. **38-39**. In a preferred application, the installation of the parapet wall **730** and the roof membrane **750** occur simultaneously with the installation of the interior partitions **562**, **565**, **567**. This is one of several options for a unitized prefabricated system of enclosing the roof of the building that could include panelized overhangs, shading devices, canopies, solar panels and/or fabric tent structures. Therefore, this example is not to be limiting in nature. The top tier of the exterior window walls **505**, **605**, **606** is the parapet wall **730**. The exemplary parapet wall **730** is an 18" high wall that connects to the roof slab **650** and accommodates the building's roofing membrane flashing and garden roof conditions. Upon placement or installation of all of the building's typical exterior window walls **505**, **605**, **606** and/or exterior walls **510**, the parapet walls **730** and associated parts arrive at the site in components of reasonable length to be immediately installed. The parapet wall **730** consists of 6 inch, 20 GA metal stud framing at 16" on center with an integrated, insulated panel **732** on one side only. The integrated, insulated panel **732** is preferably made of metal, however, other similar materials may be used. Alternative exterior finish materials include cementitious board, phenolic resin board, wood siding, gypsum reinforced fiber cement panels, precast concrete panels, and ceramic tile. The parapet wall **730** typically has integral flashing to prevent water penetrations between the parapet wall **730** and the top of the exterior window walls **505**, **605**, **606**. Exemplary parapet walls **730** are approximately 10 feet long. As shown in FIG. **38**, the parapet wall **730** is securely anchored on top of the roof slab **650** directly through the bottom track **737** to the roof slab **650** by drilling a fastener **735** or similar structure into the slab **650**.

Upon installing and anchoring the parapet wall **730**, exterior sheathing **740**A is applied on the opposite side of the insulated panel **732** to the roof side of the parapet wall **730**. As shown in FIG. **39**, after applying the exterior sheathing layer **740**A, the roof membrane **750** is applied on top of the parapet wall **730** over the block **731** and also over the sheathing layer **740**A on the vertical side of the parapet wall **730**. In FIGS. **39-40**, a flashing cap member **745** is attached over the cap support member **746** on top of the parapet wall **730**. The cap support member **746** is placed on top of the parapet wall **730** and the cap latch member is attached to the upper, roof side of the parapet wall **730**. The cap support member **746** supports the top, horizontal part of the flashing cap member **745** while the cap latch member **747** catches the vertical part on the roof side of the flashing cap member **745**. The top portion of the insulated panel **732** catches the vertical part on the exterior side of the flashing cap member **745** to tightly keep the flashing cap member **745** over the parapet wall **730**.

The next step of construction is installing the roof. The majority of the building's roof is a flat membrane roof. In one of the exemplary applications, the roof area has a garden roof system. The garden roof system is a low-maintenance, green roof system which helps reduce the site storm water run-off flow rates. This garden roof system uses high quality recycled materials and improves air quality via the creation of oxygen and the reduction of dust. The cover provided by the planting **770** minimizes the impact from UV and varying temperatures on the surrounding environment and increases the life of the roof. Sloped roofing may be used in selective locations such as independent walkways, areas with stairs and elevator landings.

Translucent roof panels may be used at sloping roofs to allow as much natural light as possible to the areas below. Any run-off from the roof surfaces are collected and stored as gray water for irrigating the plants on the green roof and in-the-site landscape. In one of the exemplary applications, an Insulated Roof Membrane (IRMA) also called a Protected Roof Membrane (PMR) System may be installed after the parapet wall **730** is installed. A monolithic, thermoplastic roofing membrane **750** is placed directly on the concrete roof slab **650**. This monolithic, thermoplastic roofing membrane **750** is a fully adhered, seamless, self-healing membrane that can be

mopped onto the top of the roof slab **650**. Upon applying the roofing membrane **750**, the roof is covered with a fiberglass-reinforced protective layer or root barrier, and additionally covered with a layer of CFC-free, closed cell rigid insulation as an air barrier. The thickness of the insulation layers are determined by the local environment and governing thermal design values.

As shown in FIGS. **40-41**, the rigid insulation layer **755** over the roofing membrane **750** is covered by a water retention mat **757** that provides drainage and aeration for the planting **770**. The mat **757** also retains some of the run-off water and provides plant irrigation via capillary action. This mat **757** is further covered with soil filter fabric and then a minimum of 8 inches of lightweight engineered soil or growth media **760**. The lightweight growth media **760** is further covered with a wind barrier planting fabric. The wind barrier planting fabric reduces soil erosion and dust while allowing the planting **770** to grow. The planting **770** is a shallow, pre-packaged, root drought-tolerant planting. If an irrigation system is to be installed, the irrigation system can be installed in conjunction with the placement of growth media **760**. Plants used in the planting **770** are typically of shallow root and drought-tolerant variety. The planting **770** may be delivered to the site in pre-planted blankets or in pre-planted modular grids.

The next step of construction is assembling exterior walkways. The application of the exterior walkways are determined by the overall building configuration and the need for structural framing adjacent to the face of the building. In another embodiment wherein the building takes on a rectilinear or L-shape scenario, all sides have diagonal bracing. In FIG. **42**, this scenario is illustrated whereby the building takes on a rectilinear or L-shape scenario. In these conditions, there is continuous horizontal beam **803** framing on all elevations. The horizontal beam **803** framing acts as drag struts for the braced frames and helps provide torsional restraint for the vertical columns **800** under jacking loads. For the rectilinear and L-shape scenarios, a column support member **815** or a bolt-on system may be used for all exterior walkways. The column support member **815** is bolted to the horizontal beam framing system. Alternatively, common walkways can be part of the unit floor slab **850** and utilize the same support system as the unit slabs **850**. In these conditions, a thermal brake is cast into the slab **850** under a unit's exterior wall **810**. The extension of the slab **850** helps reduce reinforcing requirements in the main portion of the slabs **850**, and there is no horizontal beam **803** framing to interfere with lifting.

The steps described in FIGS. **19-42** describe the sequence of assembling a standard sized studio unit **300**B, **300**C or FIG. **6**. Utilizing standard walls is easily modifiable in creating a unit with multiple bedrooms and bathrooms as described in the next steps for two and four bedroom units.

Two and Four Bedroom Units:

A typical two-bedroom unit is one and half times longer than a studio unit. Four-bedroom units are typically twice the size of a standard studio unit. There are also standard plans for two and three-bedroom corner units and efficiency units as shown in FIG. **6**. Standard wall and partition components are available which accommodate the larger units. If the overall plans for the building include a mix of unit types, the following sequence of assembly is applicable for multiple bedroom units.

The first step of constructing multiple bedroom units is delivering and staging of demising walls **520** as described in FIGS. **19-25**. As previously described in FIGS. **19-25** for standard application, the demising walls **520** are delivered to the site and staged in each unit for installation immediately after installation of the exterior window walls **505**. As also described in FIG. **13**, the demising wall **520** is installed after installation of the exterior window walls **505**.

As previously described in FIGS. **13** and **15-18**, the next step of constructing multiple bedroom units is installing the exterior window walls **505**. The sequence for the delivery and installation of the exterior window walls **505** and components are described for the standard applications in FIGS. **15-18**. Immediately after installing the exterior window walls **505**, demising walls **520** are placed and installed as described in FIGS. **13-14** and **19-25**.

The next step of constructing multiple bedroom units is placing end walls **515** for units as described in FIGS. **36** and **37**. The longer two- and four-bedroom units utilize the same utility walls **535** as a standard studio unit. However, in order to accommodate the longer multi-bedroom unit, an additional exterior wall **510** is to be provided. The exterior walls **510** are composed and anchored in exactly the same manner as the end walls **515**. The exterior walls **510** are to be provided in a different configuration than the end walls **515** and may have a window or door included. If the exterior wall **510** encloses a bedroom then the building code may require that a door or window be provided that is large enough to accommodate egress within the exterior wall **510**. The exemplary exterior wall **510** is composed of 3⅝" metal stud framing with batt insulation, electrical, communications, and life safety wiring which are installed at the factory and connected at the site. The interior side of the exterior wall **510** receives a layer of 12 mm magnesium oxide, inner wall panel **657** with a finished panel **660** (finish to be determined from the several options available) that is attached over the inner wall panel **657**. The exterior side of the exterior wall **510** receives a prefinished, insulated metal panel **661**. The exterior wall **510** system utilizes a thermally insulated head anchor **612** with a prefinished trim **665**. These anchors **612** are securely attached to the ceiling slabs **650** to hold the exterior walls **510** as shown in FIG. **36**.

The exterior wall **510** is then suspended via a crane and moved into place from the exterior of the building. The exterior wall **510** is set onto the floor slab **650** and secured into place via access from the exterior face of the building. Simultaneously, the head portion of the exterior wall **510** is placed into the slip member **630** and secured in place. In order to secure the head portion of the exterior wall **510** to the head anchor **612**, a fastener **621** is securely inserted horizontally through the vertical side of the anchor **612** and into the exterior wall **510**. The head anchor **612** further has pre-punched slots to allow any screw or fastener attachment to occur between the anchor **612** and the inner wall panel **657** to accommodate vertical movement caused by slab **650** vibration. Removable, prefinished, metal head trim **665** is placed to conceal the top of the exterior wall **510** insulation and connections. Upon anchoring the exterior wall **510** into place, a final, insulated metal panel **661** and a painted sheet metal trim **682** are installed on the outer surface of the exterior wall **510**. The final metal panel **661** conceals and insulates the edge **651** of the floor and ceiling slab **650**. As shown in FIG. **37**, a rod **683** and sealant are set at the joint between the two exterior metal panels **661** once the final panel **661** and trim **682** are in place.

The next step of construction is placing the utility wall **535** as previously described for the standard application in FIGS. **28-30**. The next step of constructing multiple bedroom units is connecting utility components and installing fixtures. The sequence of the utility connections and placement of the plumbing fixtures are previously described for the standard application in FIGS. **10-13** and **30**.

The next step of constructing multiple bedroom units is inserting a bathroom floor pan **555** with an integral drain **556** into a recess **595** within the floor slab **650** as standard application and previously described in FIGS. **26** and **27**.

The next step of constructing multiple bedroom units is installing the entry door **525** and its associated parts. Installation of the entry door **525** is previously described for the standard application in FIGS. **34** and **35**. The next step of constructing multiple bedroom units is installing interior partitions **562**, **565**, **567** for separating rooms or configuring rooms with different layouts as described in FIGS. **10-13**, **17**, **18** and **33**. The next step of constructing multiple bedroom units is installing kitchen and bathroom components as previously described in FIGS. **10-13**, **26**, and **30**.

The next step of constructing outer structures such as the parapet wall **730** for the roof, roof, and exterior or common walkways are the same as previously described in FIGS. **38-42**.

It should be noted that relative terms are meant to help in the understanding of the structures and are not meant to limit the scope of the invention. Similarly, the term "head" is meant to be relative to the term "base," and the term "top" is meant to be relative to the term "bottom." It should also be noted that the term "right" is meant to be relative to the term "left," and the term "horizontal" is meant to be relative to the term "vertical." Furthermore, the present invention is described in terms of perpendicular and parallel in direction, the terms are not meant to be limiting. It should be further noted that although the present invention is described in terms of first and second walls, the terms are not meant to be limiting. It should be further noted that although the present invention is described using certain structures such as fasteners, however, any other types of means can be used to attach the walls.

The terms and expressions that have been employed in the foregoing specification are used as terms of description and not of limitation, and are not intended to exclude equivalents of the features shown and described. This application is intended to cover any adaptations or variations of the present invention. It will be appreciated by those of ordinary skill in the art that any arrangement that is calculated to achieve the same purpose may be substituted for the specific embodiment shown. It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

What is claimed is:

1. A multi-story building, the multistory building comprising:

at least two monolithic slabs, each slab spanning an entire story of the multi-story building;

an exterior visible load-bearing steel structural frame located around the perimeter of the monolithic slabs, wherein the exterior visible load-bearing steel structural frame provides lateral outermost planar surfaces of the multi-story building that are offset and external to any outermost planar surfaces provided by premanufactured non-weight bearing walls, wherein the exterior visible load-bearing steel structural frame includes horizontal and vertical support members, wherein all of the horizontal and vertical support members are arranged around the perimeter of the monolithic slabs, and wherein each of the at least two monolithic slabs are supported by the vertical support members and a respective horizontal support member;

premanufactured non-weight bearing walls, the non-weight bearing walls having a finished exterior and including at least one of electrical, insulating, plumbing or communications components;

wherein each of the premanufactured non-weight bearing walls attach to two monolithic slabs; and

wherein the monolithic slabs, the exterior visible load-bearing steel structural frame, and the premanufactured non-weight bearing walls are arranged to form units in the multi-story building.

2. The multi-story building of claim **1**, wherein the units comprise standard single units or mixed units, the mixed units comprising at least one of studios, units having one bedroom, and units having multiple bedrooms.

3. The multi-story building of claim **1**, wherein the non-weight bearing walls comprise at least one of:

premanufactured, prefinished and preassembled exterior window walls comprising windows, insulation and weather seal;

premanufactured, prefinished and preassembled end walls comprising electrical wiring, vapor barrier, insulation, studs for framing and sound barrier, and fire-rated interior surfaces;

premanufactured, prefinished and preassembled exterior walls comprising electrical wiring, vapor barrier, insulation, studs for framing and sound harrier, and fire-rated interior surfaces;

premanufactured, prefinished, preassembled and prewired demising walls comprising electrical wiring, insulation, studs for framing and sound barrier, and fire-rated interior and exterior surfaces; or

premanufactured, prefinished, preassembled, prebundled and preplumbed utility walls comprising electrical and communications connections for adjacent walls, an electrical service panel, kitchen and bath wall plumbing, fans, vapor barrier, insulation, plumbing chase, studs for framing, and a sound and air barrier with a water resistant exterior surface.

4. The multi-story building of claim **1**, further comprising interior components, and wherein the interior components comprise at least one of:

a precast, preformed and prefabricated bathroom floor pan wherein a preformed recess of a monolithic slab receives the bathroom floor pan;

a preassembled, prewired and prefinished entry door installed between at least two non-weight bearing walls and attached to the monolithic slabs at a top portion and a bottom portion of the entry door;

a premanufactured, configurable, removable and adjustable interior partition installed on an interior side of the non-weight bearing wall of the unit; or

a premanufactured, prefinished and preassembled kitchen and bathroom component installed on a utility wall of the unit.

5. The multi-story building of claim **4**, wherein the precast, preformed and prefabricated bathroom floor pan further comprises a shower base and an integral drain.

6. The multi-story building of claim **4**, wherein the preassembled, prewired and prefinished entry door comprises a door portion, an inner frame and an outer frame, preinstalled hardware with either a right-hand or left-hand door configuration, an operable relight panel, and electrical connections to be made with at least one non-weight bearing wall.

7. The multi-story building of claim **4**, wherein the premanufactured, configurable, removable and adjustable interior partition further comprises preassembled attachment members and attaches to an interior side of at least one non-weight bearing wall and to the monolithic slabs.

8. The multi-story building of claim 4, wherein the kitchen and bathroom component comprises at least one of:

a premanufactured, prefinished and preassembled kitchen unit with cabinets, countertops, preinstalled plumbing, plumbing connections, electrical wiring, vent ducting, and exhaust fans and light fixtures;

a premanufactured, prefinished and preassembled bathroom vanity with at least one sink and preinstalled plumbing; or

a premanufactured and preassembled cabinet with an integral exhaust fan and a light fixture;

wherein the premanufactured, prefinished and preassembled kitchen unit, the bathroom vanity and the cabinet install on an inner side of a utility wall.

9. The multi-story building of claim 1, further including exterior components comprising a roof component and a prefabricated, prebundled exterior walkway with preassembled sections that support railing and decking.

10. The multi-story building of claim 9, wherein the roof component comprises a premanufactured, prefinished and preassembled parapet wall comprising studs for framing, an exterior surface with siding, and integral flashing to prevent water penetration, and wherein the roof component is installed on top of the building.

11. The multi-story building of claim 1, wherein the monolithic slabs form finished floors and ceilings of the units.

12. The multi-story building of claim 1, wherein the at least two monolithic slabs fully support their spans within the exterior visible load-bearing steel structural frame.

13. A multi-level building comprising:

premanufactured non-weight bearing walls;

multiple monolithic slabs, each slab spanning an entire level of the multi-level building; and

an exterior visible load-bearing structural frame comprising vertical columns and horizontal beams located around the perimeter of the monolithic slabs, wherein the exterior visible load-bearing structural frame provides lateral outermost planar surfaces of the building that are offset and external to any outermost planar surfaces provided by premanufactured nonweight bearing walls;

wherein a top surface of a first monolithic slab forms a floor of at least an upper unit of the multi-level building, and a bottom surface of the first monolithic slab forms a ceiling of at least a lower unit of the multi-level building, wherein the upper and lower units are further defined in part by respective ones of the premanufactured non-weight bearing walls.

14. The multi-level building of claim 13, wherein the monolithic slabs are mounted directly to the exterior visible primary load-bearing structural frame to create multiple building levels.

15. The multi-level building of claim 14, wherein at least one of the monolithic slabs spans the entire interior surface area defined by the exterior visible primary load-bearing structural frame free of additional interior load-bearing structural framing.

16. The multi-level building of claim 14, wherein the monolithic slabs are mounted directly to only vertical columns of the exterior visible primary load-bearing structural frame.

17. The multi-level building of claim 16, wherein a space exists between an edge of the monolithic slabs and the horizontal beams of the exterior visible primary load-bearing structural frame.

18. The multi-level building of claim 17, further comprising premanufactured exterior window walls that cover and seal the monolithic slab edges.

19. The multi-level building of claim 14, wherein the monolithic slabs include anchor blocks within the monolithic slabs.

20. The multi-level building of claim 14, wherein the monolithic slabs include steel channels as an edge form.

21. The multi-level building of claim 13, wherein the premanufactured non-weight bearing walls attach to both the floor and the ceiling formed by the multiple monolithic slabs.

22. The multi-level building of claim 13, wherein each premanufactured non-weight bearing wall attaches to at least one other non-weight bearing wall and to both the floor and the ceiling formed by the multiple monolithic slabs.

23. The multi-level building of claim 13, wherein the monolithic slabs are supported by the vertical columns and at least a respective horizontal beam.

24. The multi-level building of claim 13, wherein the multiple monolithic slabs support their spans within the exterior visible load-bearing structural frame.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 8,950,132 B2
APPLICATION NO. : 12/796603
DATED : February 10, 2015
INVENTOR(S) : Collins et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Drawings:

In Fig. 5, Replace the Figure with the attached Replacement sheet.

In the Specification:

In Column 4, Line 10, delete “FIG.” and insert -- FIG. 1. --, therefor.

In Column 4, Line 43, delete “FIG.” and insert -- FIGS. --, therefor.

In Column 4, Line 59, delete “FIG.” and insert -- FIGS. --, therefor.

In Column 5, Line 25, delete “illustrates” and insert -- illustrate --, therefor.

In Column 10, Line 17, delete “slabs 110” and insert -- slabs 450 --, therefor.

In Column 16, Line 18, delete “FIG.” and insert -- FIGS. --, therefor.

In Column 16, Line 29, delete “505D,” and insert -- 505C, 505D, --, therefor.

In Column 18, Line 1, delete “vaneer,” and insert -- veneer, --, therefor.

In Column 18, Line 13, delete “612E” and insert -- 612B --, therefor.

In Column 19, Line 25, delete “vaneer,” and insert -- veneer, --, therefor.

In Column 19, Line 58, delete “FIG.” and insert -- FIGS. --, therefor.

In Column 20, Line 62, delete “walls 525” and insert -- walls 505 --, therefor.

In Column 20, Line 67, delete “wall 525” and insert -- wall 505 --, therefor.

Signed and Sealed this
Eleventh Day of August, 2015

Michelle K. Lee

Michelle K. Lee
Director of the United States Patent and Trademark Office

In Column 22, Line 13, delete “FIG.” and insert -- FIGS. --, therefor.

In Column 22, Line 15, delete “figure.)” and insert -- figure) --, therefor.

In Column 25, Line 57, delete “figure.)” and insert -- figure) --, therefor.

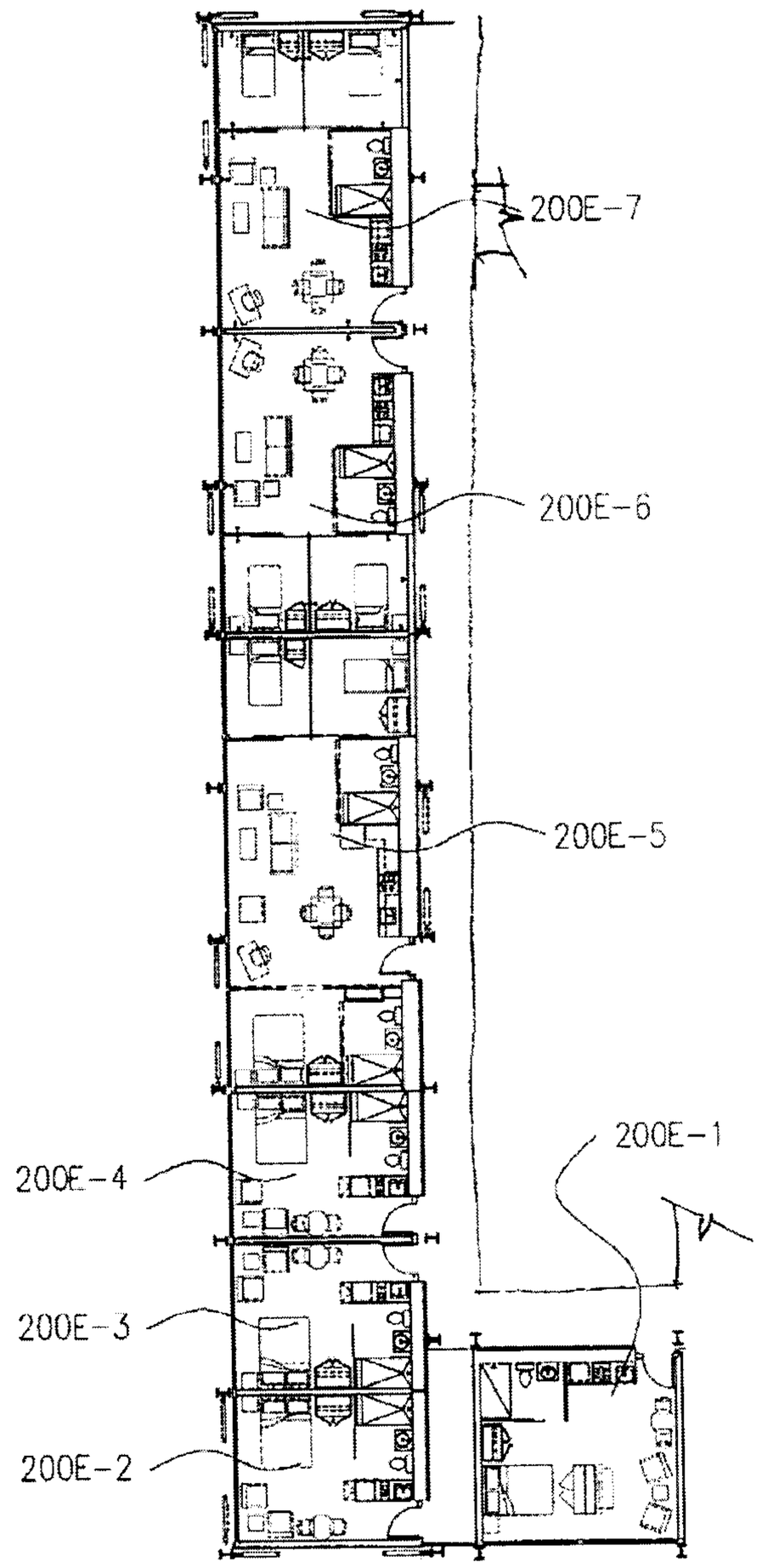
In Column 26, Line 52, delete “slab 560” and insert -- slab 650 --, therefor.

In Column 26, Line 67, delete “figure.).” and insert -- figure). --, therefor.

In Column 28, Line 1, delete “panels” and insert -- panels, --, therefor.

In the Claims:

In Column 32, Line 25, in Claim 3, delete “harrier,” and insert -- barrier, --, therefor.



200E

FIG. 5